COMPARISON OF ANALGESIC EFFICACY OF DEXAMETHASONE VERSUS DEXMEDETOMIDINE AS AN ADJUVANT TO ROPIVACAINE IN ULTRASOUND GUIDED TRANSVERSE ABDOMINIS PLANE BLOCK FOR POSTOPERATIVE PAIN RELIEF IN CAESAREAN SECTION

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BY

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DECLARATION

I declare that the thesis entitled **"COMPARISON OF ANALGESIC EFFICACY OF DEXAMETHASONE VERSUS DEXMEDETOMIDINE AS AN ADJUVANT TO ROPIVACAINE IN ULTRASOUND GUIDED TRANSVERSE ABDOMINIS PLANE BLOCK FOR POSTOPERATIVE PAIN RELIEF IN CAESAREAN SECTION"** has been prepared by me under the guidance of **Dr. Kamakshi Garg**, Associate Professor, Department of Anaesthesiology, Dayanand Medical College and Hospital, Ludhiana. No part of this thesis has formed the basis for the award of any degree previously.

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Dedicated

to

my family

&

teachers

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Dr. Nitika Singla

ABBREVIATIONS

%	Percentage
ASA	American Society of Anaesthesiologists
BMI	Body Mass Index
BP	Blood Pressure
cm	Centimeter
C-section	Caesarean section
CSF	Cerebro spinal fluid
CWI	Continous wound infiltration
DBP	Diastolic blood pressure
ECG	Electrocardiogram
Fig.	Figure
HR	Heart rate
Hr/h/hrs	Hour
i.e	That is
Inj	Injection
IV	Intravenous
Kg	Kilogram
L3-L4	Lumbar vertebra
LSCS	Lower Segment Caesarean Section
MAP	Mean arterial pressure
mcg	Microgram
mg	Milligram
min	Minute
ml	Milliliter
mm	Millimeter
mmHg	Millimeter of mercury
NIBP	Non-invasive blood pressure
NSAIDS	Non- steroidal anti-inflammatory drugs
PCA	Patient Controlled Analgesia
Post op	Post operative

R	Ropivacaine
RR	Respiratory rate
SBP	Systolic blood pressure
SD	Standard deviation
SpO2	Arterial oxyhaemoglobin saturation
T	Thoracic vertebrae
T6-L1	Thoracic sixth- lumbar first vertebrae
TAP	Transverse Abdominis Plane
USG	Ultrasonography
VAS	Visual Analogue Scale
Yr	Year

ABSTRACT

Background – Various adjuvants have been used to increase the efficacy of local anesthetic in Transverse abdominis plane (TAP) block. Comparison of dexamethasone and dexmedetomidine as an adjuvant to ropivacaine have not been studied in TAP block.

Aims- We compared the analgesic efficacy on addition of dexamethasone and dexmedetomidine to ropivacaine in TAP block for postoperative pain relief following caesarean section.

Material and Methods- After clearance from Institutional Ethics Committee, a double blind, prospective, randomized study was carried out on 100 parturients ASA 1-3, aged 18-45 years posted for cesarean section under spinal anesthesia. USG guided bilateral TAP block was performed in both groups. Group A received 50 ml of 3mg/kg of ropivacaine along with 0.1 mg/kg dexamethasone while Group B received 50 ml of 3mg/kg ropivacaine along with 1mcg/kg dexmedetomidine. Time to initial self-reporting of post-operative pain, time to first rescue analgesic demand, hemodynamic parameters and side effects were noted.

Results- Time to initial self-reporting of post-operative pain (411.00±143.35 vs 338.20±196.13 min, $p< 0.005$) and time to first rescue analgesic (474.30±153.99 vs 407.30±202.31, $p< 0.005$) were significantly longer in group B as compared to group A. VAS score at time of initial self-reporting of pain was significantly lower in group B. No significant hemodynamic changes or side effects were noted.

Conclusion – Addition of dexmedetomidine to ropivacaine as compared to dexamethasone in bilateral TAP block following caesarean section prolongs the time to initial post-operative pain and time to first rescue analgesic consumption.

Key Words- TAP block, Ropivacaine, Caesarean section, Postoperative pain relief, VAS

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INTRODUCTION

Transverse abdominis plane (TAP) block is a new, rapidly evolving regional anaesthesia technique which blocks the neural afferents by using a local anaesthetic into the neural fascial plane between the internal oblique and transverse abdominis muscle[1]. The use of ultrasound in anaesthesiology has made application of transverse abdominis plane block popular. This block decreases postoperative pain, thus reducing the requirement for analgesia.

Postoperative pain after caesarean section is of great concern for mother especially when the effect of spinal anaesthesia starts weaning off. This pain has the potential to disrupt mother- child bonding[2] and impairs early post operative maternal rehabilitation and recovery[3]. Inadequately treated pain after caesarean section has been reported to be associated with an increased incidence of chronic pain and post-traumatic stress syndrome.

Management of post caesarean pain is crucial for the anaesthesiologist particularly during the first 24 hours to facilitate early ambulation and better infant care. Pain management after caesarean section is usually multimodal including intravenous acetaminophen, non steroidal anti-inflammatory agents (NSAIDS), opioids, epidural analgesia and peripheral nerve block[4].

Neuro-axial as well as systemic opioids can provide effective pain relief in immediate postoperative period but they are associated with unwanted side effects like nausea, vomiting, pruritis and delayed respiratory depression[3,5,6].

Oral and intravenous analgesics have several limitations. Acetaminophen is effective only for mild pain and higher doses are required for moderate to severe pain. These elevated doses may cause acute fulminant hepatic failure. Similarly high dose of NSAIDS can cause liver, renal and gastro-intestinal problems [4].

Wound infiltration has also been tested in recent years but it is associated with post-operative wound site infection. To overcome these challenges, there is always a need for alternative modalities of pain relief offering lesser side effects and optimal analgesic action[5].

In recent years, regional blocks have been gaining popularity for post-operative pain relief[5]. Transverse abdominis plane block is new regional anaesthetic technique that provides analgesia following abdominal surgery. TAP block significantly reduces pain when it is used either as a primary anaesthetic technique or as a compliment to general anaesthesia, spinal anaesthesia or local anaesthesia.

Many reports suggest that TAP block may also be safe alternative to epidural analgesia technique in patients who are on anticoagulant therapy or in patients who would not tolerate haemodynamic instability. It provides effective pain relief with fewer complications[7].

TAP block provides excellent analgesia to the skin and muscles of the anterior abdominal wall following inguinal hernia repair, appendicectomy, radical prostectomy, abdominoplasty, caesarean section, laproscopic choleycystectomy etc, by blocking sensory nerves which transmits pain, by injecting the local anaesthetic into transverse abdominis plane[7]. This plane contains thoracolumbar nerves originating from T6-L1, ilio-inguinal, ilio-hypogastric nerve which supply to skin, muscles, and parietal peritoneum of anterior abdominal wall[7]. Real time ultrasonography facilitates the easy needle visualization and visualization of local anaesthetic spread into the target fascial plane[7].

Various local anaesthetics like ropivacaine, bupivacaine, levobupivacaine have been utilized for post- operative analgesia with ultrasound guided TAP block[8].

Ropivacaine and bupivacaine are commonly used local anaesthetics for TAP block. However ropivacaine is preferred as it provides prolonged postoperative analgesia with a greater margin of safety for cardio toxicity and neurotoxicity and less systemic side effects.

Various adjuvants such as dexmedetomidine, dexamethasone, magnesium, fentanyl have been used with local anaesthetics enhancing both their duration and analgesic efficacy. It has been found that the use of dexamethasone [9] and dexmedetomidine as an adjuvant to ropivacaine for nerve blocks improves the quality and duration of local anaesthetics[4,9].

Dexamethasone is long acting, potent steroid which acts by attenuating the release of inflammatory mediators, reducing neuronal discharge and inhibiting potassium channel mediated discharge of nocioceptive C- fibres, hence providing better quality for post-operative analgesia[9]. However limited studies are available on use of dexamethasone in ultrasound guided TAP block for reducing post-operative pain in caesarean section.

Thorough search of literature revealed a limited use of dexmedetomidine along with ropivacaine for ultrasound guided TAP block for post-operative pain relief after caesarean section. The mechanism by which dexmedetomidine prolongs the duration of local anaesthetics arises from various factors. Dexmedetomidine is a selective alpha -2 adrenergic agonist[10], reduces inflammation and prolongs the duration of nerve block through vasoconstriction by maintaining concentration of local anaesthetics[9]. It prolongs the duration of nerve block by inhibiting activated cationic current[9]. Dexmedetomidine blocks the conduction of nerve signal through C and A delta fibres and may stimulate the release of encephalin like substances at peripheral sites[9]. In this way, dexmedetomidine potentiates the local anaesthestic effects and prolongs their analgesic duration.

Most of studies have compared TAP block with systemic or oral analgesics. As fewer studies have compared the use of dexamethasone and dexmedetomidine as an adjuvant to local anaesthetics in TAP block, hence we proposed to compare the analgesic efficacy of dexamethasone and dexmedetomidine as an

adjuvant to ropivacaine in ultrasound guided TAP block for postoperative pain relief in patients undergoing caesarean section.

AIMS AND OBJECTIVES

Comparative evaluation of analgesic efficacy of dexamethasone versus dexmedetomidine as an adjuvant to ropivacaine for post operative pain relief in caesarean section.

REVIEW OF LITERATURE

Abdominal field block have been around for long time and have been extensively used. The transverse abdominis plane block was first introduced by Rafi[1]. The description of landmark technique for performing TAP block advocated a single entry, the triangle of Petit, access the number of abdominal wall nerves, hence provided more wide spread analgesia[2].

It involves injection of local anesthetic into the plane between internal oblique and transverse abdominis muscle. Since the thoracolumbar nerves originating from T6 to L1 spinal roots run into this plane and supply sensory nerves to anterolateral abdominal wall, the local anaesthetic spread in this plane can block the neural afferent and provide analgesia. The innervations anterolateral abdominal wall arise from anterior rami of spinal nerves T7 to L1. These include the intercostal nerves (T7-T11), the subcostal nerve (T12) and ilio-hypogastric and ilio-inguinal nerve (L1)[2].

Anterior division of T7- T11 continues from intercostal space and supply the skin of the front of abdomen. Midway in their course, they pierce external oblique giving off the lateral cutaneous branch which divides into anterior and posterior branch which supply the external oblique and latismus dorsii respectively. The anterior branch of T12 communicates with the ilio-hypogastric nerves and give a branch to pyramidalis[2].

The ilio-hypogastric nerve (L1) divides between the internal oblique and transverse abdominis near the iliac crest into lateral and anterior cutneous branches, the former supplying part of skin of the gluteal region while latter supplies the hypogastric region. The ilio-inguinal nerve (L1) communicates with the hypogastric nerve near the anterior part of the iliac crest and supplies the upper and medial part of thigh and part of the skin covering the genitalia[2].

The aim of TAP block is to deposit local anaesthetic in the plane between internal oblique and transverse abdominis muscle targeting spinal nerves in this plane.

The block can be performed using surface landmark or using ultrasound guided technique. With the advancement of ultrasound, TAP block has become technically easier and safer to perform, so TAP block was used as therapeutic adjunct for analgesia after abdominal surgeries such as caesarean section, hysterectomy, colectomy, prostectomy, hernia repair etc. There are several approaches for ultrasound guided TAP block such as lateral, posterior, subcostal and oblique subcostal approach.

In midaxillary or lateral TAP block, ultrasound probe placed in transverse plane to lateral abdominal wall in midaxillary line between lower costal margin and iliac crest where the three layer are most distinct. After measuring the depth of TAP, the needle is introduced piercing skin, subcutaneous tissue, external oblique and internal oblique, until it reaches the plane between internal oblique and transverse abdominis muscle[2].

Upon reaching the plane, 2ml of saline is injected to confirm the correct needle position after which 25ml of solution is injected on each side. The transverse abdominis plane is visualized expanding with the injection (appear as a hypo echoic space).

Studies have compared the analgesic efficacy of different local anaesthetic in TAP block with local infiltration technique.

A randomized double blind controlled done by Tawfil M et al compared the bilateral ultrasound guided TAP block with single shot local anaesthetic wound infiltration using 0.25 percent bupivacaine for post-operative analgesia after caesarean delivery performed under subarachnoid block on 80 parturients. In the infiltration group, participants received 15 mL of bupivacaine 0.25% in each side of the surgical wound (total 30 mL); and in the TAP group, participants

received 20 mL of bupivacaine 0.25% bilaterally in the TAP block (total 40 mL) They concluded that there was no significant difference in post operative fentanyl consumption, pain scores and satisfaction in parturients among both the groups[11].

Chandon M et al conducted a randomized study on one hundred twenty parturients and compared the analgesic efficacy of ultrasound guided TAP block versus continuous wound infiltration with levobupivacaine after caesarean section. Patients in ultrasound guided TAP block group received 150 mg levobupivacaine and the other group received continuous wound infiltration (CWI) of 150 mg of levobupivacaine for first day and 12.5 mg/hr thereafter through elastomeric pump for 48hr.The study was prematurely terminated due to occurrence of generalized seizure in one patient of TAP group. Thirty six patients with TAP and twenty nine patients with CWI had completed the study. The study observed no difference between TAP block and CWI for post-operative analgesia[3].

Telnes A et al did a randomized double blind study comparing the bilateral TAP block with 20 ml of 0.25% bupivacaine plus adrenaline 5 mcg/ml, reconstituted it with 20 ml of normal saline to make total of 40 ml versus wound infiltration with same amount of local anaesthetic mixture for post-operative pain relief after caesarean section in sixty parturients. The main outcome of the study was cumulative morphine consumption at 48 hrs after surgery. They found that the wound infiltration with local anaesthetic when compared with TAP block did not reduce cumulative morphine consumption. However, the TAP block was associated with more pronounced sedation[2].

A double blind randomized controlled trial performed by Srivastva U et al on sixty two parturients compared the role of bilateral TAP block using 20 ml of 0.25% bupivacaine with the group not receiving TAP block at the end of surgery. A standard analgesic with 75 mg diclofenac sodium and intravenous patient controlled analgesia with tramadol through elastromeric pump were given in both the groups. The authors

concluded that TAP block was effective in providing analgesia with a substantial reduction in tramadol use during 48 hours after caesarean section when used as adjuvant to standard analgesia[6].

Sinha S et al compared ultrasound guided TAP block with bupivacaine and ropivacaine as local anaesthetic for post-operative analgesia in laproscopic choleycystectomy. In group 1, 30 patients receive ultrasound guided TAP block at the end of surgical procedure with 0.25% bupivacaine and in Group 2, 30 patients received 0.375% ropivacaine via TAP block and all patient were assessed for post-operative pain and rescue analgesia consumption at 10min, 30 min, 1hr, 4hr, 8hr, 12hr, 24hr time points. They found that patients receiving ultrasound guided TAP block with ropivacaine had significantly lower pain score when compared to patients who received the block with bupivacaine in immediately post-operative period upto 1hr. However, both the drugs were equivalent for overall postoperative analgesic and 24 hr cumulative rescue analgesic requirement[8].

Faludi N et al did a single blind, randomized controlled study on 75 patients and evaluate the efficacy of unilateral TAP block with 20 ml of 0.5% ropivacaine and 0.25% bupivacaine administered for postoperative analgesia in patients undergoing lower abdominal surgeries performed under spinal anaesthesia. The authors concluded that mean duration of analgesia was less in bupivacaine group as compared to ropivacaine group which was found to be statistically significant. Hence 0.5% ropivacaine provided longer duration of analgesia than 0.25 % bupivacaine when used in TAP block on patients of lower abdominal surgeries[12].

Mankikar M et al conducted a double blind, prospective, randomized study on 60 patients undergoing caesarean section under spinal anaesthesia to undergo bilateral TAP block with 15 ml of 0.5% ropivacaine versus control group with normal saline at the end of surgery. The study concluded that TAP block with ropivacaine reduces post- operative VAS at 24 hours. Time to rescue analgesia was

prolonged and mean requirement of analgesic in the first 24 hour was significantly reduced in the study group[13].

Studies have been done regarding the administration of different adjuvants with local anaesthetic but few study compared the efficacy of dexamethasone and dexmedetomidine as an adjunct to local anaesthetics in TAP block for post-operative pain relief after caesarean section.

Deshpande J et al performed a double blind, randomized controlled trial on sixty patients, aged 40-60 years posted for elective open abdominal hysterectomy under subarachnoid block and provide TAP block for post-operative pain relief. Control group (R) recieved TAP block using 20 ml of 0.5% ropivacaine with 1ml of 0.9% saline. Test Group (RD) received 20 ml of 0.5% ropivacaine with 4 mg dexamethasone and found that post-operative pain score were significantly less at 4, 6 and 12 hr in group RD as compared to group R. Significant longer time for first rescue analgesic demand (13.2+/- 7.6 hr v/s 7.14+/- 4.6 hr) with lesser tramadol requirement (50.2+/- 34 v/s 94 +/- 35mg) during post-operative 24 hr and lower incidence of nausea and vomiting were observed in group RD as compared to group R[14].

Sharnouby NM et al conducted a randomized study with different doses of dexamethasone with 0.25% isobaric bupivacaine in TAP block for post-operative analgesia in patients scheduled for laparoscopic vertical banded gastroplasty. A total of 111 bariatric patients were randomized blindly into three parallel groups. Group BC received TAP block using 20 ml of isobaric bupivacaine hydrochloride 0.25%+2 ml saline 0.9%. Group BD4 received TAP block using 20 ml of isobaric bupivacaine hydrochloride 0.25% plus 4 mg dexamethasone and group BD8 received TAP block using 20 ml of isobaric bupivacaine hydrochloride 0.25% plus 8 mg dexamethasone. Postoperatively pain scores were significantly lower in Group BD4 and Group BD8 compared with Group BC at rest and on movement at 6, 8, 12, and 24

h. They also found that adding dexamethasone (4mg or 8mg) to 0.25% isobaric bupivacaine in TAP block reduces post-operative pain, reduces analgesic requirement and promotes early ambulation in bariatric patients. They observed that the addition of 4mg dexamethasone was equipotent to 8mg of dexamethasone for TAP block[15].

Kartlov A et al evaluated the effect of addition of dexamethasone to ropivacaine as an adjunct in ultrasound guided TAP for post-operative analgesia on patient undergoing open inguinal hernia surgeries under general anesthesia. In group 1, 30 patients receive only general anaesthesia. Patients in group 2 received general anaesthesia and unilateral TAP with 25 ml of 0.5% ropivacaine. Patients in group 3 received general anaesthesia and unilateral TAP(D) block with 25 ml of 0.5% ropivacaine along with 4mg dexamethasone. They found better post -operative pain scores and 24hrs reduction of the morphine consumption in group 3 compared to group 1 and 2[7].

Parasuraman V etal conducted a prospective randomized, parallel treatment, double blind study on forty patients in two groups. After induction of general anaesthesia, one group received ultrasound guided TAP block with 15 ml of 0.25% levobupivacaine plus 4mg dexamethasone on each side. Another group received TAP block on both sides with 15 ml of 0.25% levobupivacaine and 8mg intravenous dexamethasone. They found that dexamethasone has comparative effect on quality of analgesia in TAP block with 0.25% levobupivacaine when administered in either of the routes[16].

A study was conducted by Gnanasekar N et al comparing the efficacy of dexamethasone as an adjunct to ropivacaine versus ropivacaine alone in TAP block for lower abdominal surgery. Seventy adult patients undergoing lower abdominal surgery were allocated into two groups to receive general anaesthesia and TAP block with 20 ml of 0.25 percent ropivacaine along with 8mg dexamethasone and second group received 20 ml of 0.25% ropivacaine bilaterally for post-operative pain

relief. The analgesic efficacy in terms of pain scores, morphine consumption and occurrence of nausea and vomiting was compared between two group. They found that the addition of dexamethasone to ropivacaine significantly improved the quality of analgesia with reduced consumption of opioids as compared to plain ropivacaine in TAP block[17].

Bansal P et al studied the effect of addition of dexmedetomidine to ropivacaine in TAP block for post-operative pain relief in caesarean section. Patients were divided into two group of 20 patient each. Control group received TAP block with 3mg/kg of ropivacaine diluted to total of 40 ml normal saline. Test group received 3mg/kg of ropivacaine with 50 mcg dexmedetomidine diluted to total of 40 ml normal saline. Ultrasound guided TAP block with 20 ml of drug was given on each side. They concluded that time to initial onset of pain and time to first rescue analgesia were significantly longer in test group compared with control group[4].

A study was conducted by Xue Y et al on the effect of dexmedetomidine as an adjunct in TAP block in gynaecological laproscopy. Ninety patients were randomly allocated in 3 groups. Group1, which received post operative intravenous analgesia after general anaesthesia; group 2 received TAP block with 20 ml of 0.375% ropivacaine and group 3 received TAP block with 20 ml of 0.375% ropivacaine and 1 mcg/kg dexmedetomidine. They concluded that ultrasound guided TAP block combined with dexmedetomidine adjunct may improve recovery from anaesthesia and reduce post-operative pain[10].

Varshney A et al did a study on ninety healthy women undergoing caesarean section delivery under spinal anaesthesia and were randomized into three groups. One group received 20 ml of 0.25% levobupivacaine on each side; second group received TAP block with same volume of levobupivacaine along with 1 mcg/kg of dexmedetomidine and third group did not receive TAP block. This

study concluded that in early post-operative period, bilateral TAP block with 0.25% levobupivacaine provided good analgesia and the addition of dexmedetomidine further improved the pain and gave higher satisfaction score without increase in side effects[18].

ThakurJ et al compared the dexmedetomidine and dexamethasone as an adjunct to bupivacaine in TAP block for post-operative analgesia in caesarean section. They took one twenty patients in the study who were randomly divided into 3 groups; B, BDM, BDX to receive bupivacaine alone (38 ml of 0.25% bupivacaine and 2ml of 0.9% normal saline) or with dexmedetomidine adjuvant (38 ml of 0.25% bupivacaine and 2ml of 1mcg/kg dexamedetomidine) or along with dexamethasone adjuvant (38 ml of 0.25% bupivacaine and 2ml of 0.1mg/kg dexamethasone) in ultrasound guided TAP block. The study concluded that the addition of dexmedetomidine and dexamethasone as an adjunct to bupivacaine reduces post operative pain, prolonged analgesia and decrease demand for additional analgesia and provided better maternal satisfaction as compared to plain bupivacaine group in TAP block. Among dexmedetomidine and dexamethasone, dexmedetomidine had prolong analgesia as compared to dexamethasone group[19].

After thorough literature search, we could not find any study comparing dexmedetomidine with dexamethasone as an adjuvant to ropivacaine in TAP block for post-operative analgesia in caesarean section. Hence, we proposed to compare the analgesic efficacy of dexamethasone and dexmedetomidine as an adjuvant to ropivacaine in ultrasound guided TAP block for postoperative pain relief in C-section.

MATERIAL AND METHODS

SOURCE OF DATA

The study was conducted in Department of Anaesthesiology, Dayanand Medical College and Hospital, Ludhiana in a randomized double blind manner on a total of 100 parturients after approval from the hospital ethics committee. A written informed consent was obtained from all parturients recruited for the study.

METHOD OF COLLECTION OF DATA

A total of 100 parturients belonging to ASA I-III scheduled for caesarean section were included in this study and were randomly allocated into two groups of 50 parturients each using computer generated random number list contained in sequentially sealed envelopes. These envelopes were opened by an anaesthesiologist not involved in the study. The same anaesthesiologist prepared the drug solution as per random allocation group and handed them in a blinded manner to the anaesthesiologist who administered the block.

Group A –Comprised of 50 parturients who received 50 ml of 3mg/kg ropivacaine along with 0.1mg/kg dexamethasone bilaterally via TAP block.

Group B –Comprised of 50 parturients who received 50 ml of 3mg/kg ropivacaine along with 1mcg/kg dexmedetomidine bilaterally via TAP block.

INCLUSION CRITERIA-

- ASA I-IIIparturients
- Elective caesarean section
- 18-45 years of age

EXCLUSION CRITERIA-

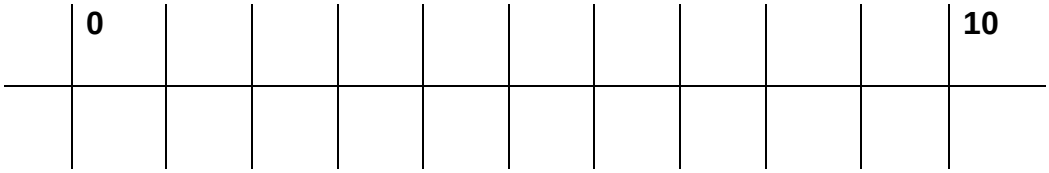
- Any contraindications to spinal anaesthesia
- History of recent opioid exposure
- Hypersensitivity to any of the drugs used in the study
- Significant cardiovascular, renal, or hepatic disease; and known fetal abnormalities.

METHOD OF COLLECTION OF DATA

Pre Anaesthetic Check Up

A written informed consent was taken from all the parturients. Pre anaesthetic check up was conducted a day before surgery which included thorough history, general physical and systemic examination of all parturients. Required investigations like complete haemogram and coagulogram was done before surgery. Parturients were informed about the need of analgesia after surgery and apprised on the use of VAS scale.

VISUAL ANALOGUE SCALE



Visual Analogue Scale having 0 to 10 equidistant markings with a marker was shown and the parturients were educated on the use of the scale to assess the post-operative pain. Scoring was accomplished by asking the parturient to place the marker on the scale along the 0 to 10 marks with 0 corresponding to ‘no pain’ and 10 corresponding to ‘worst imaginable’ pain. Scoring was done according to the intensity of pain felt by parturients on interrogation after surgery.

ANAESTHESIA TECHNIQUE

One hundred parturients undergoing caesarean sections were included in this study. Peripheral vascular access was obtained with a18-gauge or 20gauge intravenous cannula. Standard monitors were applied to all parturients in the operating room. Non-invasive blood pressure (mmHg), heart rate (min^{-1}), and peripheral oxygen saturation (%) values were tracked by non-invasive methods on regular time interval as per protocol. Under all aseptic precautions, spinal anaesthesia was administered, using a midline standard approach. The intrathecal space was accessed by traversing the L3–L4 interval, with a 26-G Quincke needle. After confirmation of clear cerebrospinal fluid flow, 12 mg of 0.5% hyperbaric bupivacaine was injected intrathecally. The

anaesthesiologist performed spinal anaesthesia on patients in the left lateral or sitting position. Only patients with successful spinal anaesthesia were included in the study. After the completion of surgical procedure, all included parturients received the TAP block as per group allocation. An experienced anaesthesiologist performed the transverse abdominis plane block by placing ultrasound probe in the transverse plane to the lateral abdominal wall in midaxillary line between the lower costal margin and iliac crest. The needle was introduced in plane of ultrasound probe directly using in-line approach and advanced until it reaches the plane between the internal oblique and transversus abdominis muscles. The probe followed the needle entry point medially in its superficial path and then returned to its original position in the midaxillary line as the needle is directed deeper. Upon reaching the plane, 2 ml of saline was injected to confirm correct needle position which was followed with the injection of total volume of 50 ml of drug solution bilaterally via TAP block. This time of institution of TAP block was taken as time zero. Time to initial reporting of postoperative pain was recorded and the VAS value at this time was also noted. Post-operative pain was also evaluated by VAS at hourly interval till VAS≥3. The patients were asked to provide a number, with ten being the most worst pain they ever had, and zero being no pain. Rescue analgesic was administered at VAS≥3 and this time was recorded as time of first rescue analgesic administration. Slow intravenous injection of diclofenac sodium 75 mg was administered as first rescue analgesic and continued on 8 hourly basis thereafter.

Post-operative pain scores till the time to first rescue analgesic administration was recorded along with haemodynamic parameters. The end point of the study was VAS≥3 when the first rescue analgesic dose was administered. Any patient sleeping comfortably in the bed at any time of observations was not disturbed and considered to be pain free having VAS score of less than 3 at that time of observation. Adverse event like bradycardia, hypotension if any was noted.

Blinding

A person not involved in the study prepared the study drugs in 50cc coded syringe labelled study drug and handed over to anaesthesiologist at end the of the procedure under all aseptic precautions. The candidate assessed and recorded the time to initial postoperative pain and time to initial rescue analgesic administration following the surgical procedure. At the end of the study, the codes were decoded.

Outcome

The outcome of parturients was evaluated in terms of time to initial postoperative pain and time of first rescue analgesic administration post-operatively at VAS≥3 post-operatively. Any adverse effects were also evaluated.

Primary Outcome Measures:

a) Time to initial postoperative pain.

Secondary Outcome Measures:

a) Time to initial rescue analgesia administration at VAS≥3

b) Adverse effects if any.

OBSERVATIONS

The following parameters were recorded post-operatively after shifting the patient to recovery room:

- Monitor Heart Rate (HR), NIBP, Respiratory Rate (RR), SpO2 (oxygen saturation) hourly.
- Assessment of pain using visual analogue scale hourly and whenever parturient complains of pain after shifting to post-operative recovery room.
- Time of giving first rescue analgesic administration at VAS ≥3.
- Adverse effects if any.

STATISTICAL ANALYSIS

Data was described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. Comparison of quantitative variables

between the study groups were done using Student t-test and Mann Whitney *U* test for independent samples for parametric and non-parametric data respectively. For comparing categorical data, Chi square ($\chi 2$) test was performed and exact test was used when the expected frequency was less than 5. A probability value (*p* value) less than 0.05 was considered statistically significant. All statistical calculations were done using SPSS (Statistical Package for the Social Science) SPSS 21 version statistical program for Microsoft Windows.

Sample Size Calculation

Sample size calculation was done based on the study done by Bansal P et al[4] as a template and using time to rescue analgesia as the main parameter and power came out 0.95 and with effect size of 0.73 with 10% chance of error. The sample size of 50 each for two groups was taken i.e. total sample size of 100.

OBSERVATIONS AND RESULTS

Table 1: Distribution of subjects according to Age (years) and BMI (kg/m^2)

	Group A		Group B		t	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
Age	29.18	3.51	28.82	3.61	0.506	0.614	-1.05	1.77
BMI	27.74	3.80	27.81	2.76	-0.096	0.924	-1.38	1.25

Both groups were statistically comparable with respect to demographic variables (p value> 0.05)

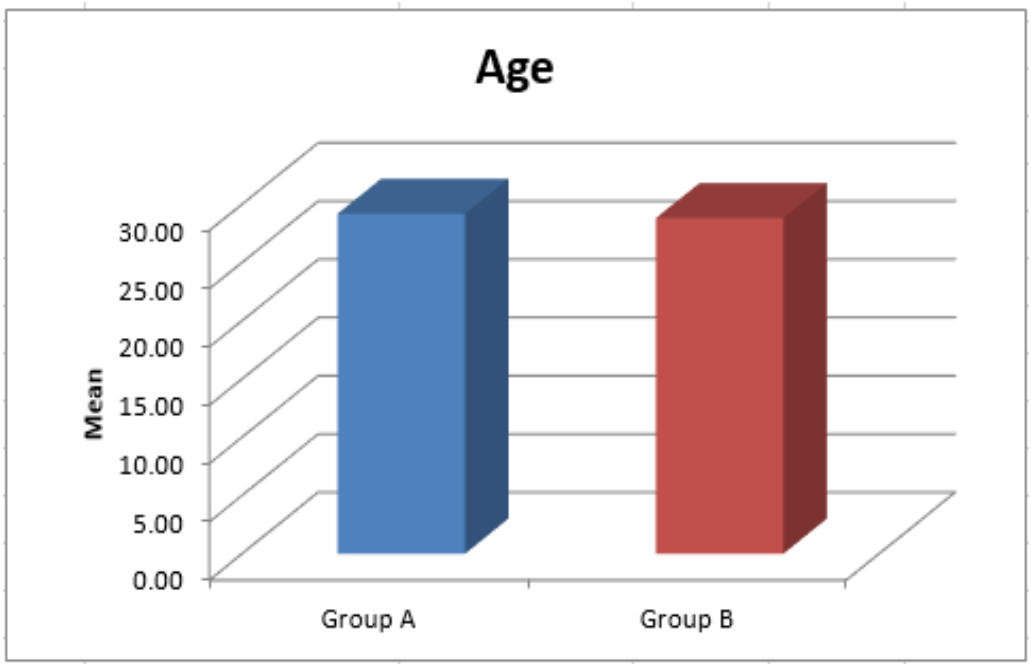


Figure 1: Distribution of subjects according to age (years)

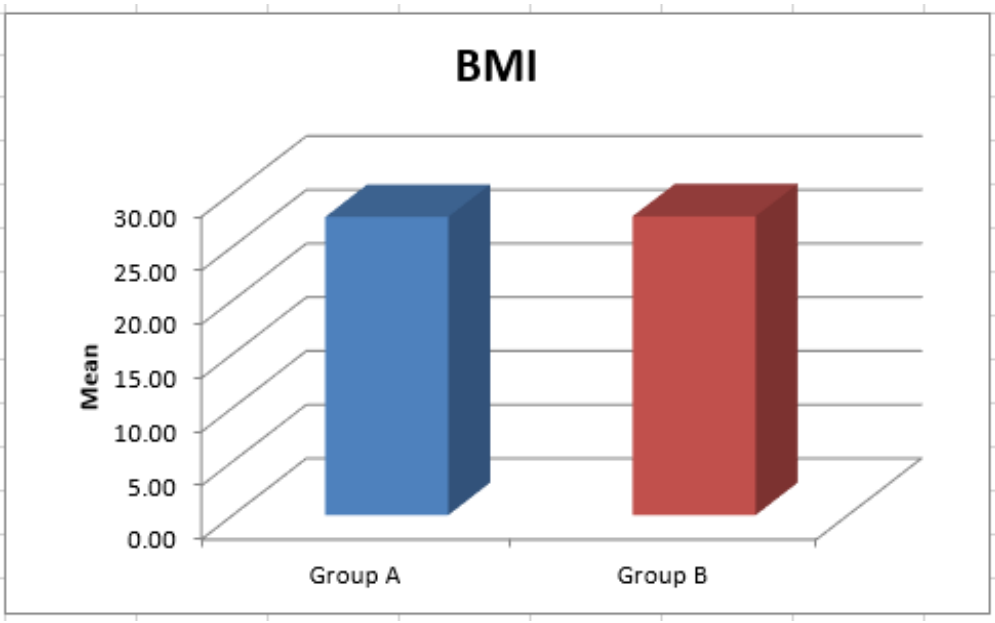


Figure 2: Distribution of subjects according to BMI (Kg/m2)

Table 2: Distribution of subjects according to Duration of Surgery (minutes)

	Group A		Group B		t	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
Duration of surgery	72.30	14.75	69.20	11.04	1.190	0.237	-2.07	8.27

Mean duration of surgery in group A was 72.30+/-14.75 minutes and in group B was 69.20+/-11.04 minutes. Both groups were statistically comparable with respect to the duration of surgery (p value> 0.05)

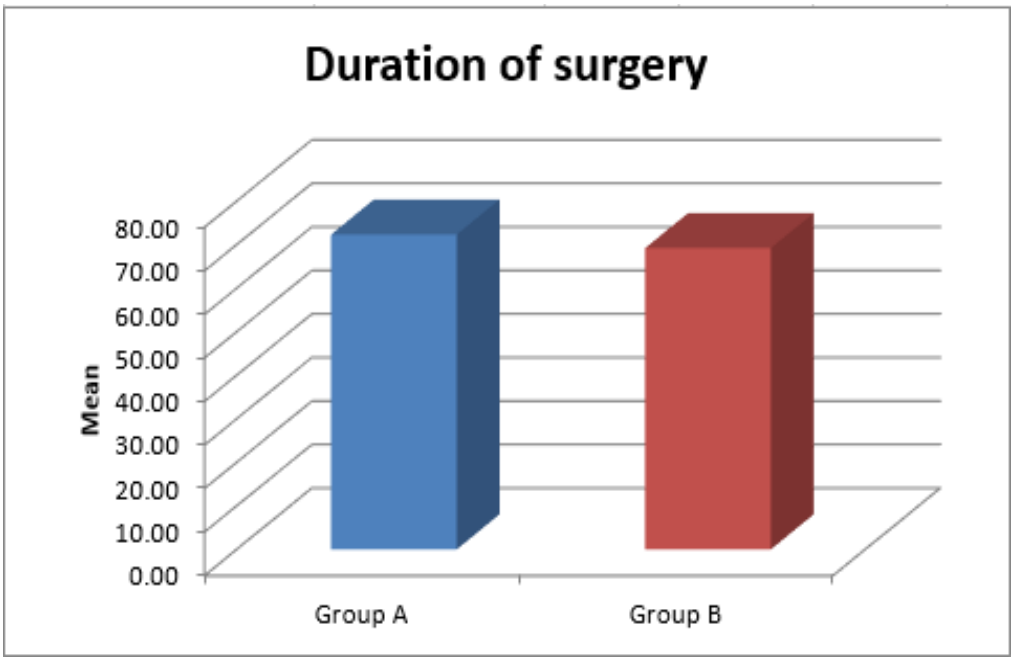


Figure 3: Distribution of subjects according to Duration of Surgery (minutes)

Table 3: Trends in postoperative Mean Heart Rate (per min)

	Group A		Group B		t	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
HR Immediately in recovery room	88.18	8.90	84.62	14.31	1.494	0.138	-1.17	8.29
HR_2 hours	85.84	7.46	83.20	13.91	1.183	0.240	-1.79	7.07
HR_4 hours	84.08	6.87	80.96	12.93	1.496	0.138	-1.02	7.26
HR_6 hours	82.80	6.89	79.77	11.34	1.544	0.126	-.87	6.93
HR_8 hours	81.04	7.20	80.38	11.31	0.261	0.795	-4.36	5.67
HR_10 hours	80.46	7.96	79.13	14.62	0.295	0.770	-7.95	10.63
HR_12 hours	83.78	9.87	84.22	10.27	-0.094	0.927	-10.51	9.62
HR_16 hours	80.67	9.35	88.50	3.42	-1.579	0.153	-19.27	3.60
HR_20 hours	80.00	10.71	82.67	2.31	-0.415	0.696	-19.20	13.87
HR_24 hours	81.00	7.07	76.00	8.49	0.640	0.588	-28.60	38.60

On inter-group comparison between group A and B, mean heart rate was statistically non-significant at all time interval postoperatively (p value>0.05)

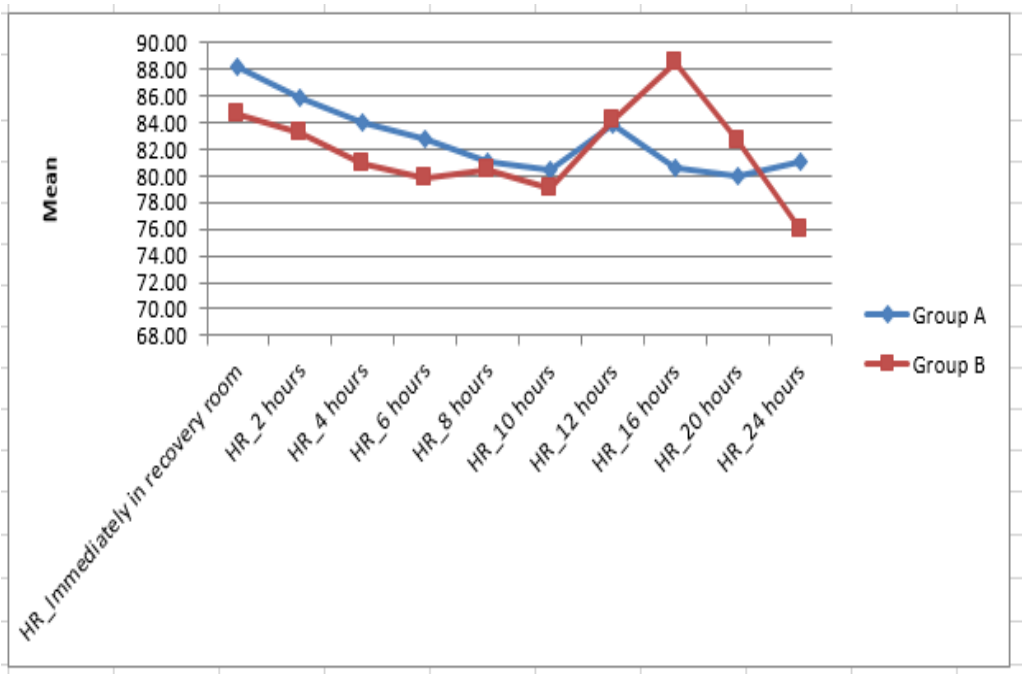


Figure 4: Trends in postoperative Mean Heart Rate (per minute)

Table 4: Trends in postoperative Mean Systolic Blood Pressure (mmHg)

	Group A		Group B		t	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
SBP_Immediately in recovery room	136.24	8.35	131.84	15.27	1.787	0.077	-.49	9.29
SBP_2 hours	132.52	9.34	128.66	12.32	1.765	0.081	-.48	8.20
SBP_4 hours	130.33	6.98	126.44	10.27	2.197	0.030	.38	7.40
SBP_6 hours	129.43	7.23	125.00	10.05	2.448	0.016	.84	8.03
SBP_8 hours	128.80	7.30	126.94	11.96	0.689	0.494	-3.54	7.25
SBP_10 hours	131.54	6.39	128.60	12.93	0.743	0.464	-5.19	11.06
SBP_12 hours	132.00	7.81	135.50	6.12	-1.019	0.325	-10.82	3.82
SBP_16 hours	127.67	5.57	136.67	7.02	-2.113	0.072	-19.07	1.07
SBP_20 hours	128.50	6.19	129.33	8.33	-0.153	0.884	-14.82	13.15
SBP_24 hours	124.00	2.83	128.00	11.31	-0.485	0.676	-39.48	31.48

In the immediate postoperative period, mean systolic blood pressure was 136.24+/-8.35 mmHg in group A and was 131.84+/-15.27 mmHg in group B which was statistically non-significant (p value > 0.05). Mean systolic blood pressure was statistically non-significant at all time interval postoperatively between two groups (p value> 0.05)

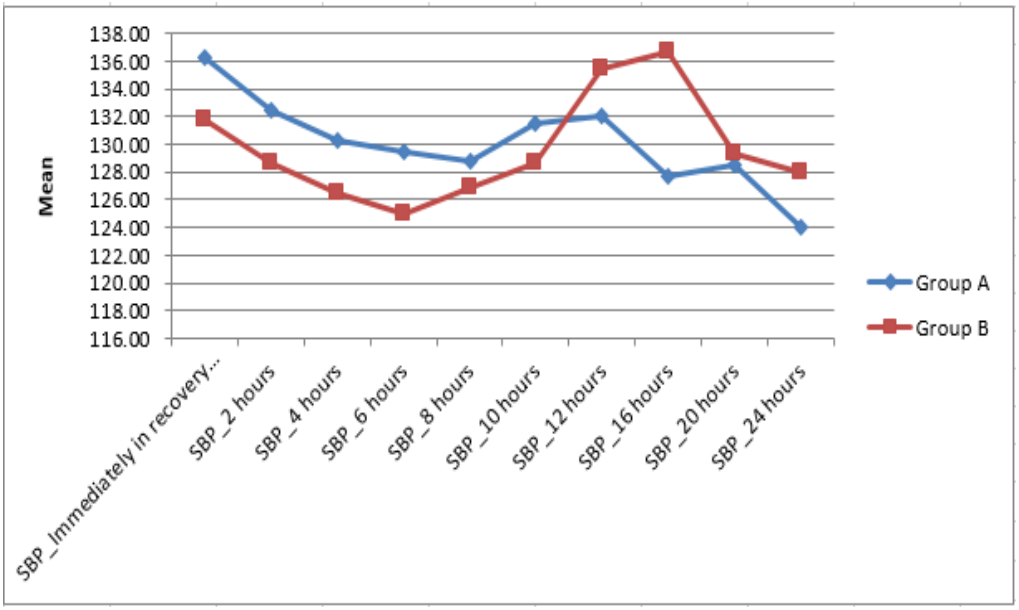


Figure 5: Trends in postoperative Mean Systolic Blood Pressure (mmHg)

Table 5: Trends in postoperative Mean Diastolic Blood Pressure (mmHg)

	Group A		Group B		t	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
DBP_Immediately in recovery room	81.06	9.14	78.08	12.94	1.330	0.187	-1.47	7.43
DBP_2 hours	79.08	8.94	77.38	11.89	0.808	0.421	-2.47	5.87
DBP_4 hours	77.04	8.95	74.84	9.87	1.161	0.248	-1.56	5.96
DBP_6 hours	76.15	8.49	74.13	9.20	1.109	0.270	-1.60	5.66
DBP_8 hours	75.44	7.99	74.49	9.57	0.407	0.685	-3.74	5.65
DBP_10 hours	76.92	8.19	76.07	10.60	0.236	0.815	-6.59	8.31
DBP_12 hours	78.22	9.97	78.13	7.97	0.022	0.983	-9.32	9.52
DBP_16 hours	70.33	6.62	77.33	4.62	-1.618	0.150	-17.23	3.23
DBP_20 hours	68.50	7.19	77.33	6.43	-1.678	0.154	-22.37	4.70
DBP_24 hours	65.00	9.90	77.00	9.90	-1.212	0.349	-54.59	30.59

In the immediate postoperative period, mean diastolic blood pressure was 81.06+/-9.14 mmHg in group A and was 78.08+/-12.94 mmHg in group B which was statistically non-significant (p value> 0.05). Mean diastolic blood pressure was statistically non-significant at all time intervals postoperatively between two groups (p value> 0.05)

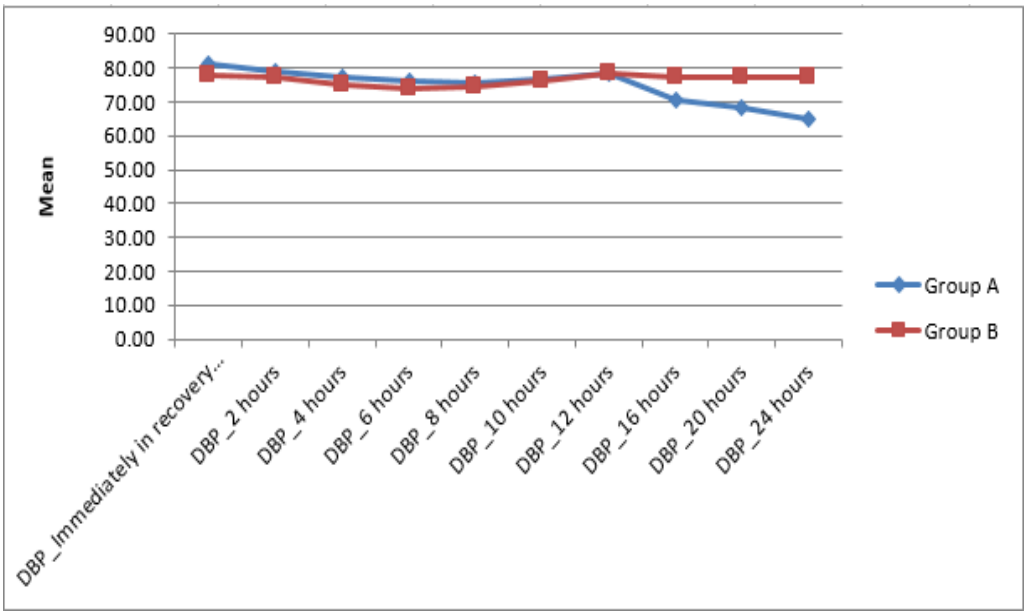


Figure 6: Trends in postoperative Mean Diastolic Blood Pressure (mmHg)

Table 6: Trends in postoperative Mean Arterial Pressure (mmHg)

	Group A		Group B		t	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
MAP_Immediately in recovery room	98.54	7.83	95.44	13.22	1.426	0.157	-1.21	7.41
MAP_2 hours	96.66	7.95	93.74	11.87	1.445	0.152	-1.09	6.93
MAP_4 hours	94.59	7.36	92.02	9.36	1.518	0.132	-.79	5.93
MAP_6 hours	93.40	6.67	90.92	8.78	1.529	0.130	-.74	5.71
MAP_8 hours	93.04	6.55	91.74	9.64	0.583	0.562	-3.16	5.75
MAP_10 hours	95.07	5.97	93.40	10.17	0.535	0.597	-4.74	8.09
MAP_12 hours	95.70	6.72	97.00	6.44	-0.416	0.683	-7.93	5.33
MAP_16 hours	89.57	4.58	97.11	5.18	-2.308	0.050	-15.07	-.01
MAP_20 hours	89.40	5.41	94.67	6.93	-1.210	0.272	-15.92	5.39
MAP_24 hours	84.00	5.66	93.50	10.61	-1.118	0.380	-46.07	27.07

In the immediate postoperative period and at all time intervals, mean arterial pressure was statistically non -significant (p value > 0.05) between two groups.

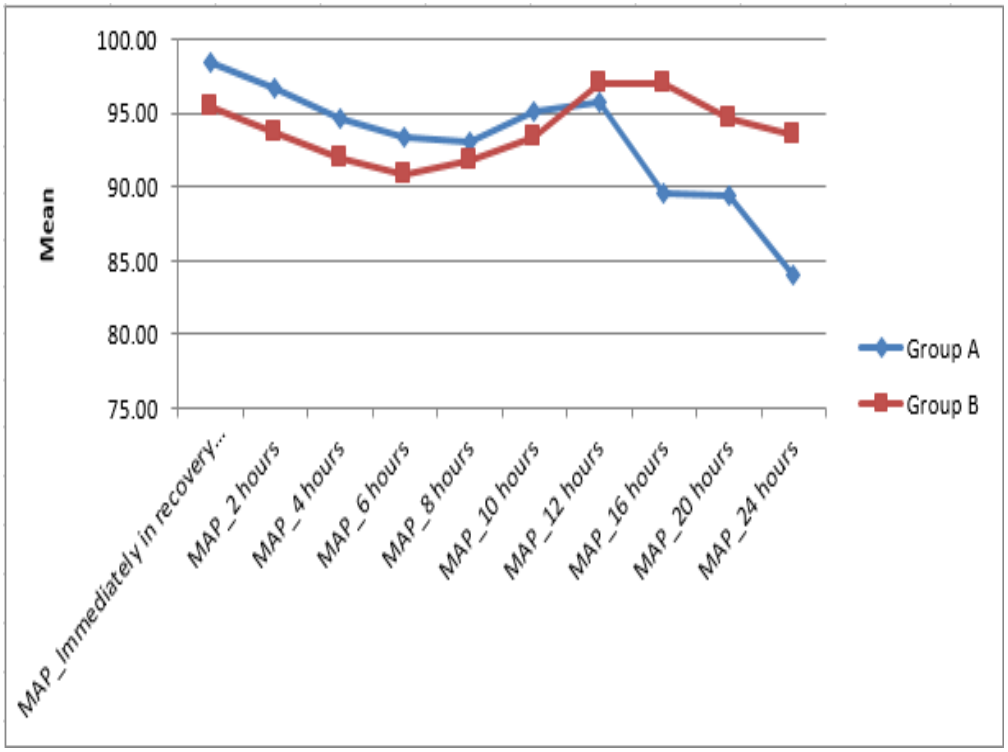


Figure7: Trends in postoperative Mean Arterial Pressure (mmHg)

Table 7: Trends in postoperative SpO2 (%)

	Group A		Group B		Z	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
SPO2_Immediately in recovery room	98.18	1.42	98.48	0.99	-1.099	0.272	.201	.379
SPO2_2 hours	98.32	1.35	98.38	1.16	-0.228	0.819	.665	.835
SPO2_4 hours	98.20	1.31	98.26	1.24	-0.396	0.692	.599	.781
SPO2_6 hours	98.13	1.36	98.23	1.24	-0.500	0.617	.483	.677
SPO2_8 hours	98.16	1.31	98.09	1.16	-0.534	0.593	.473	.667
SPO2_10 hours	98.29	1.27	98.20	1.08	-0.601	0.548	.473	.667
SPO2_12 hours	98.40	1.26	97.88	0.99	-1.673	0.094	.020	.120
SPO2_16 hours	98.71	0.76	98.67	0.58	-0.488	0.626	.970	1.000
SPO2_20 hours	99.00	0.00	98.67	0.58	-1.291	0.197	.362	.558
SPO2_24 hours	99.00	.000[a]	99.00	.000[a]	0.000	1.000		

In the immediate postoperative period at all time interval, spO2 was statistically non-significant (p value > 0.05) between two groups.

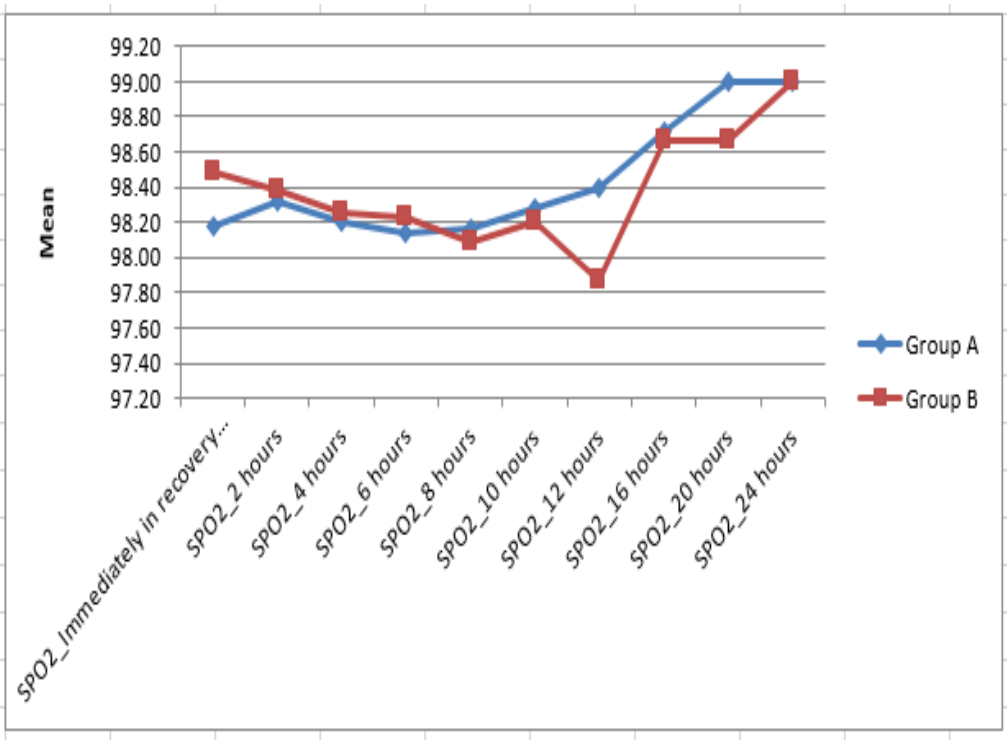


Figure 8: Trends in postoperative SpO2 (%)

Table 8: Trends in postoperative Mean Respiratory Rate (breaths per minute)

	Group A		Group B		Z	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
RR_Immediately in recovery room	15.88	2.15	15.64	2.05	-0.768	0.442	.294	.486
RR_2 hours	15.12	2.11	14.84	2.14	-0.845	0.398	.285	.475
RR_4 hours	14.69	1.85	14.12	1.91	-1.794	0.073	.000	.063
RR_6 hours	14.58	1.74	13.92	1.80	-1.973	0.058	.002	.078
RR_8 hours	14.52	2.10	14.18	1.99	-0.986	0.324	.285	.475
RR_10 hours	13.71	1.90	14.13	1.77	-0.438	0.661	.578	.762
RR_12 hours	13.80	1.75	15.25	1.49	-1.643	0.100	.056	.184
RR_16 hours	13.43	1.90	13.33	2.31	-0.130	0.896	.970	1.000
RR_20 hours	13.60	1.67	13.33	2.31	-0.322	0.747	.854	.966
RR_24 hours	14.00	2.83	12.00	0.00	-1.000	0.317	.970	1.000

In the immediate postoperative period and at all time intervals, mean respiratory rate was statistically non-significant (p value > 0.05) between two groups

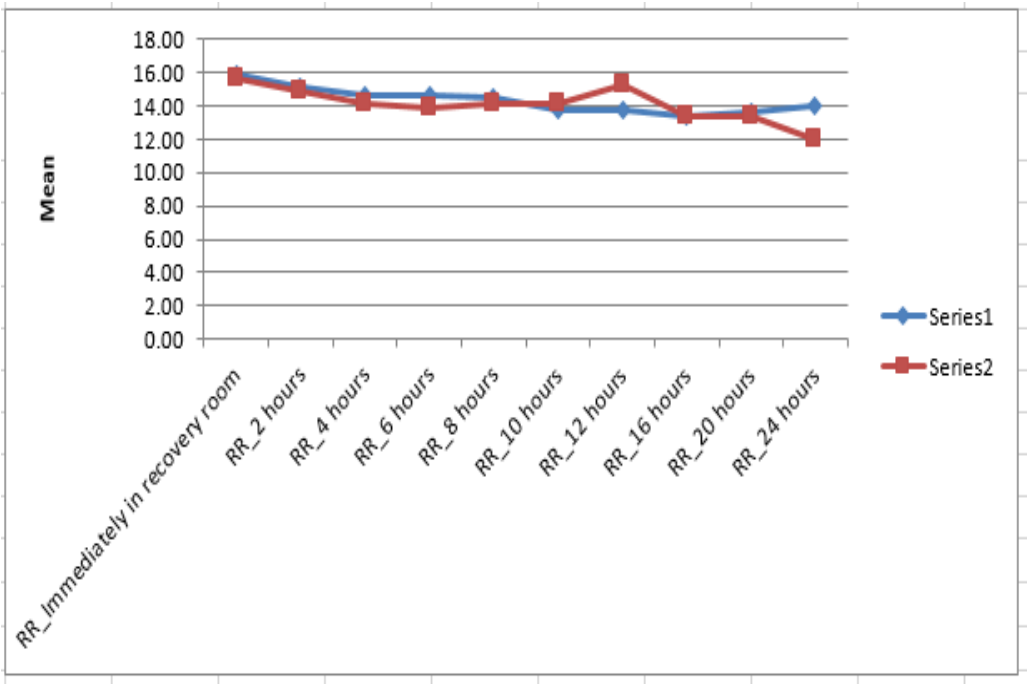


Figure 9: Trends in postoperative Mean Respiratory Rate (breaths per minute)

Table 9: Duration (in minutes) and mean VAS at the time of initial self-reporting of postoperative pain

	Group A		Group B		Z	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
Time to initial self reporting of post operative pain	338.20	196.13	411.00	143.35	-3.303	0.001	.000	.030
Mean VAS initial	1.52	0.50	1.22	0.42	3.236	0.002	.116	.484

Mean time at which the patient first reported pain in group A was 338.20±196.13 min while in group B, it was 411.00±143.35 min. This difference in the time at which patients reported initial pain in postoperative period was statistically significant (p=0.001). Mean VAS at this time of self-reporting of pain was 1.52 in group A while in group B, it was 1.22. This difference was also found to be statistically significant (p=0.002).

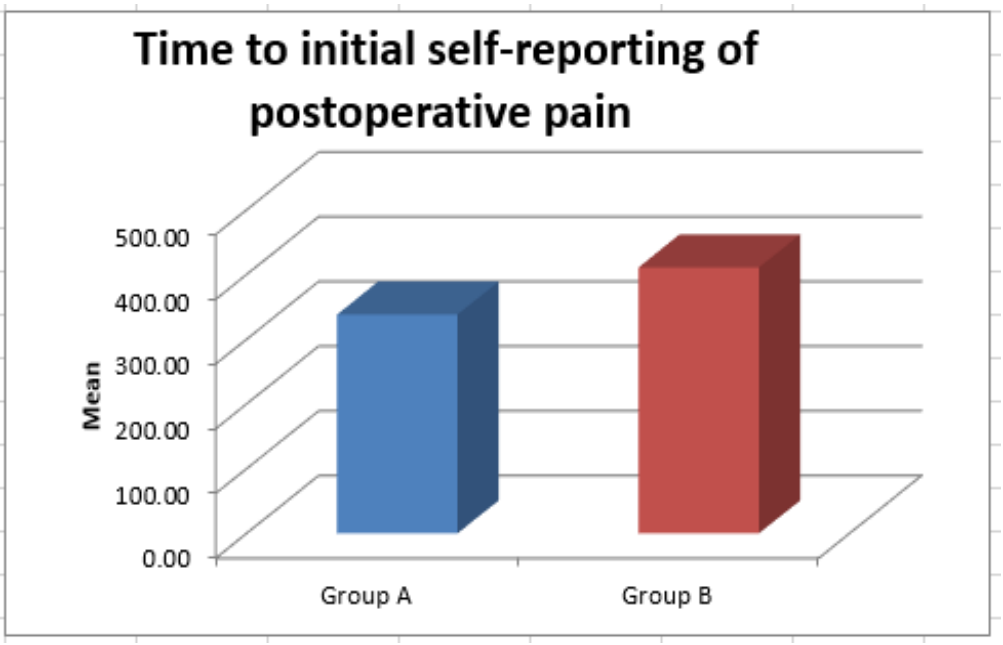


Figure 10: Mean duration (min) to initial self-reporting of postoperative pain

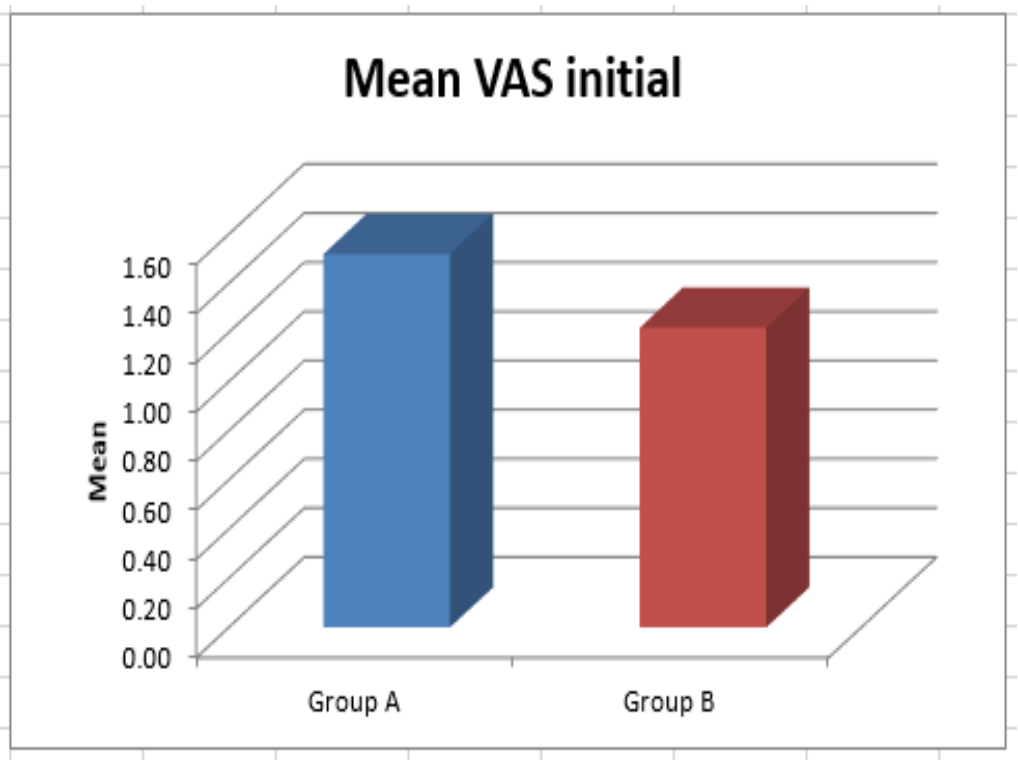


Figure 11: Mean VAS at the time of initial self-reporting of postoperative pain

Table 10: Mean time to first rescue analgesic given when VAS ≥3

	Group A		Group B		Z	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
Time to first rescue analgesic consumption when VAS ≥3	407.30	202.31	474.30	153.99	-2.942	0.003	.000	.030

Mean time when VAS ≥3 and first rescue analgesic given in group A was 407.30 ± 202.31 min while in group B, it was at 474.30 ± 153.99 min. Thus there was statistically significant increase in the duration of analgesia in group B as compared to group A (p value <0.05).

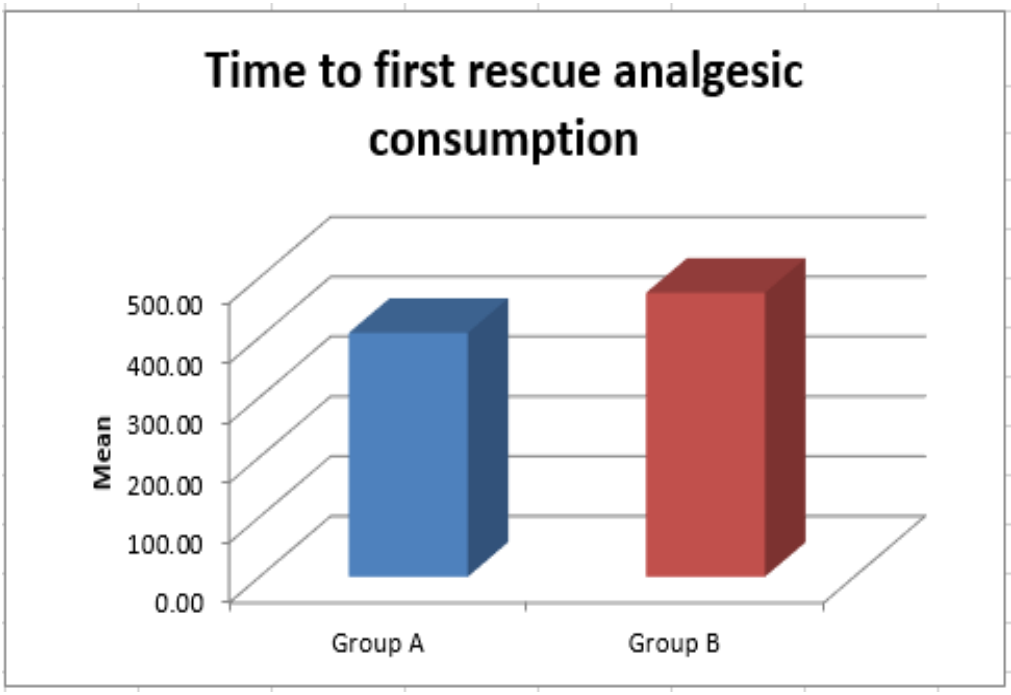


Figure 12: Mean time to first rescue analgesia given when VAS≥3

Table 11: Side effects

		Group				Total	Chi-square value	p-value
		A		B				
Adverse effects if any	No	50	100.0%	45	90.0%	95	5.263	0.056
	Bradycardia, hypotension	0	0.0%	5	10.0%	5		
Total		50	100.0%	50	100.0%	100		

Out of 50 patients in group B, 5 patients had postoperative hypotension while in group A, no such adverse effect was noticed. Results were statistically insignificant.

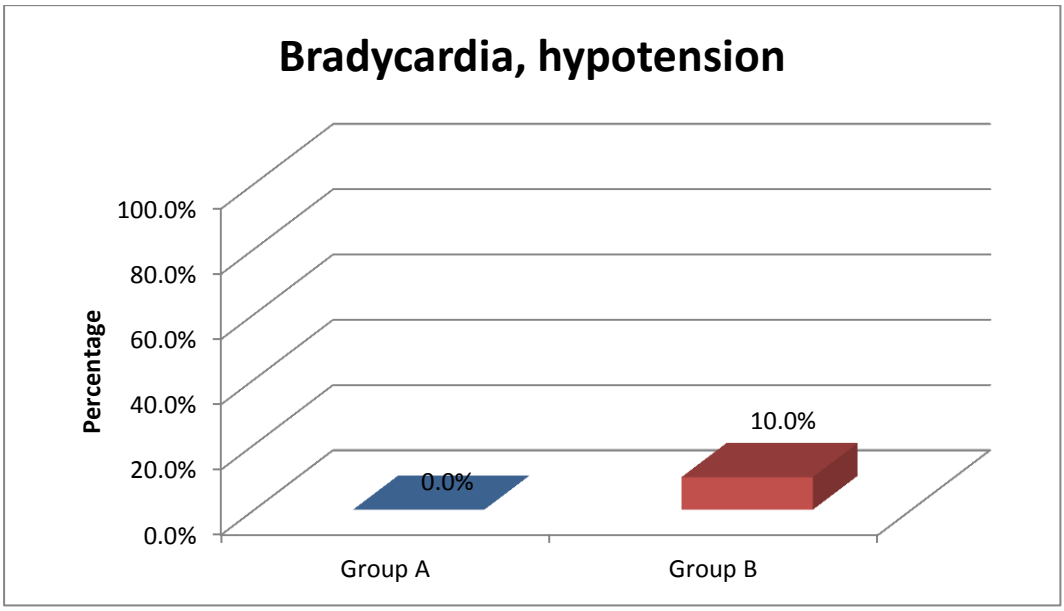


Figure 13: Side effects

DISCUSSION

Postoperative pain after caesarean section is distressing for mother and affects the maternal child-bonding[2]. Managing this pain is a challenging task for the anaesthesiologist[6]. Pain relief after caesarean helps in effective breast feeding, decreases postpartum depression and helps in early ambulation, thereby reducing the risk of thromboembolism. Analgesic regimen should be safe, effective[6] with minimal transfer of drug to neonate via breast milk[19]. The use of intravenous opioids for post-operative pain relief has been associated with nausea, vomiting, pruritis and respiratory depression in mother[3]. Despite their good analgesic action, cautious use of NSAIDS is recommended as they are associated with many adverse effects like coagulopathy, gastrointestinal bleeding and kidney dysfunction[4]. Currently multimodal analgesia technique involving abdominal field block like TAP block with parenteral analgesics is becoming popular for these patients[6].

TAP block provides good analgesia, is a cost effective technique and reduces consumption of opioids and NSAIDS in post-operative period[19]. TAP block is safe and effective modality for post- operative analgesia and helps to enhance recovery after anaesthesia. Tradionally, TAP block technique was used with blind end points (pops) making their success unpredictable[20]. Nowadays, ultrasound guided TAP block technique has been used for better localization and deposition of local anaesthetics with widespread analgesia. It is associated with higher success rate and lesser complications.

In literature, different local anaesthetics with variable concentrations have been used for TAP block. In a study Sinha S et al compared the efficacy of 0.25% bupivacaine and 0.375% ropivacaine as a local anaesthetic in ultrasound guided TAP block for post-operative pain relief in laproscopic choleycystectomy. They found that patients receiving ultrasound guided TAP block with ropivacaine had significantly lower pain score as compared to patients receiving

bupivacaine in immediate post-operative period[8]. Faludi N et al also compared 0.5% ropivacine with 0.25% bupivacaine in TAP block for postoperative analgesia in lower abdominal surgeries. They concluded that ropivacaine provided longer duration of analgesia than bupivacaine when used in TAP block on patients of lower abdominal surgeries[12]. Both dexamethasone and dexmedetomidine have been used as adjuncts in TAP block for pain relief following caesarean delivery with bupivacaine as local anaesthetic[19]. We could not elucidate studies comparing use of these adjuncts with ropivacaine in TAP block. We decided to use ropivacaine in our study, as it has significantly less neurotoxic and cardiotoxic side effects with improved efficacy and longer duration of action when used in TAP block for post caesarean pain relief. It also has better sensori-motor differentiation[4].

Various studies have been carried out to demonstrate the analgesic efficacy and safety of dexamethasone[13,21-28] and dexmedetomidine[4,29-32] as an adjunct in neuro-axial and peripheral blocks. Dexamethasone produces analgesia through its anti-inflammatory or immunosuppressive action[33,34]. It potentiates the action of local anaesthetic through modulation of function of the potassium channels[34]. Neuroprotection and anti-hyperalgesia effects with clinically relevant dosing of perineural dexamethasone with local anaesthetics has also been studied[36,37] .

Sharnouby NM et al conducted a study with different doses of dexamethasone with 0.25% isobaric bupivacaine in TAP block for post-operative analgesia in bariatric surgery. They found that adding dexamethasone (4mg or 8mg) to 0.25% isobaric bupivacaine in TAP block reduces post-operative pain, reduces analgesic requirement and promotes early ambulation in bariatric patients. They also observed that addition of 4mg dexamethasone was equipotent to 8mg of dexamethasone for TAP block[15]. This encouraged us to choose a dose of 0.1mg/kg dexamethasone in our study as mean weight of most of our study parturients was 70 kg. Deshpande J et al studied the effect of adding 4mg of dexamethasone to 0.5% ropivacaine in ultrasound

guided TAP block for post-operative pain relief after abdominal hysterectomy. They found reduced post-operative pain scores at different time intervals with longer time for the demand to first rescue analgesia in dexamethasone with ropivacaine group as compared to ropivacaine alone group[14]. Therefore, we selected dexamethasone as one of the adjuvant in TAP block.

We chose dexmedetomidine as another adjuvant to ropivacaine in our study, as it is a highly selective central alpha -2 adrenergic agonist[10]. It has profound sedative, anxiolytic and analgesic properties. It reduces the inflammation and prolongs the duration of nerve block through vasoconstriction and inhibiting hyperpolarization activated cationic current[9]. Dexmedetomidine acts by blocking the conduction of nerve signal through C and A delta fibres and may stimulate the release of encephalin like substances at peripheral sites[9]. In this way, dexmedetomidine potentiates the local anaesthestic effects and prolongs their analgesic duration.

The studies which used ropivacaine along with dexmedetomidine have showed that addition of dexmedetomidine improves the post-operative pain by prolonging the time for need of first rescue analgesic thereby decreasing the requirement of additional analgesics.[4,29-32]

In our study, we observed that time to initial self-reporting of postoperative pain was significantly less in dexmedetomidine group as compared to dexamethasone group. We also found that mean time to first rescue analgesic administration when VAS ≥3 was prolonged in parturients receiving dexmedetomidine as an adjunct to ropivacaine as compared to those parturients receiving dexamethasone. Hence, we infer that significant reduced intensity of pain free period was experienced by parturients receiving dexmedetomidine as adjuvant to ropivacaine in TAP block.

Similar findings have been reported by Thakur J et al who compared dexmedetomidine and dexamethasone as an adjunct to bupivacaine in TAP block for postoperative analgesia in caesarean section in 120

adult patients. The participants were randomly divided into 3 groups; B, BDM, BDX to receive bupivacaine alone (38 ml of 0.25% bupivacaine and 2ml of 0.9% normal saline) or with dexmedetomidine adjuvant (38 ml of 0.25% bupivacaine and 2ml of 1mcg/kg dexamedetomidine) or along with dexamethasone adjuvant (38 ml of 0.25% bupivacaine and 2ml of 0.1mg/kg dexamethasone) in ultrasound guided TAP block. The study concluded that addition of dexmedetomidine and dexamethasone as an adjunct to bupivacaine reduces post-operative pain, prolongs duration of analgesia and decreases demand for additional analgesic requirement. The duration of analgesia was prolonged by 82 minutes in dexmedetomidine group[19]. Our results are in concordance with this study as the time to initial self-reporting of postoperative pain being prolonged by 73 minutes in dexmedetomidine group parturients as compared to dexamethasone group. The dosage of dexamethasone and dexmedetomidine used in our study are also similar with those used in study by Thakur J et al.[19] However, we used ropivacaine as a local anaesthetic of choice.

In our study, we used intravenous injection diclofenac sodium 75 mg as rescue analgesic, once patient complained of pain at VAS ≥3. The mean time to first rescue analgesic was 67 minutes later in patient receiving dexmedetomidine group as compared to dexamethasone group which was statistically significant. Our findings are similar to the results of Bansal P et al study who compared the efficacy of TAP block after addition of dexmedetomidine (1mcg/kg) to 3mg/kg of ropivacaine for post-operative analgesia after caesarean section. They concluded that the group receiving dexmedetomidine as an adjuvant to ropivacaine were 90 minutes more pain free than the patients receiving ropivacaine alone and mean time to first rescue analgesic was 84 minutes later in dexmedetomidine group as compared to ropivacaine alone group[4]. This difference in time for requirement of rescue analgesia was more in their study as they compared ropivacaine alone with group receiving dexmedetomidine where as in

our study, we compared dexamethasone with dexmedetomidine when used as an adjuvant to ropivacaine (3mg/kg) in TAP block.

We also recorded bradycardia and hypotension in 10% of parturients in dexmedetomidine group whereas heart rate, systolic BP and diastolic BP was better maintained in dexamethasone group. This can be explained by action of dexmedetomidine on centrally acting alpha 2A adrenergic receptor, causing decreased release of nor-adrenaline from the sympathetic nervous system[4].

The limitation of our study is that our follow up period for post-operative pain relief was short; hence we could not gauge the total analgesic consumption for 24-48 hours postoperatively. Also we measured the pain score of parturients during their resting phase and could not monitor the analgesic requirement while movement, which is essential for the lactating parturients.

Thus we inferred from our study that addition of dexmedetomidine in a dose of 1mcg/kg to ropivacaine results in significantly prolonged pain free period and experienced lesser intensity of pain as compared to parturients receiving dexamethasone 1mg/kg in TAP block for postoperative pain relief.

SUMMARY AND CONCLUSION

The present study was conducted in the Department of Anaesthesiology, Dayanand Medical College and Hospital, Ludhiana after getting approval from the Institutional ethics committee. We performed comparison of dexamethasone and dexmedetomidine as an adjuvant to ropivacaine in ultrasound guided TAP block for postoperative pain relief.

One hundred patients belonging to ASA grade I-III scheduled for caesarean section under spinal anaesthesia were studied in a randomized, double blind manner after a written informed consent. The patients were randomly allocated into two groups of 50 patients each using computer generated random numbers to receive:

Group A: Bilateral transverse abdominis plane block with 3mg/kg of ropivacaine plus 1mg/kg of dexamethasone diluted to total of 50ml in normal saline with 25 ml on each side.

Group B: Bilateral transverse abdominis plane block with 3mg/kg of ropivacaine plus 1mcg/kg of dexmedetomidine diluted to total of 50ml in normal saline with 25 ml on each side.

Postoperatively patients were assessed for time to initial self-reporting of postoperative pain, time to first rescue analgesia administration when VAS ≥3, hemodynamic parameters and side effects if any. Results were analyzed statistically.

We observed that both groups were comparable in respect to demographic variables and postoperative hemodynamic parameters. Pain free period and time to first rescue analgesic administration was significantly higher in patients when dexmedetomidine was added as an adjunct to ropivacaine as compared to dexamethasone. Hypotension and bradycardia was observed in few parturients receiving dexmedetomidine as compared to the group receiving dexamethasone but the results were statistically insignificant.

Hence we conclude that addition of dexmedetomidine to ropivacaine in TAP block significantly reduces initial postoperative pain and time to first rescue analgesic as compared to dexamethasone in parturients undergoing lower segment caesarean section.

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PROFORMA

GROUP: CR NO:

SERIAL NO: DATE OF ADMISSION:

NAME: DATE OF SURGERY:

AGE/SEX: ADMISSSION NO:

WEIGHT: ADDRESS:

HEIGHT: BMI:

OCCUPATION:

SURGEON:

ANAESTHESIOLOGIST:

TIME OF START OF SURGERY:

DURATION OF SURGERY:

ASA GRADE:

PRE-ANAESTHETIC CHECK-UP

RELEVANT HISTORY

PRESENT:

PAST:

PERSONAL HISTORY:

GENERAL PHYSICAL EXAMINATION:

BLOOD PRESSURE:	PULSE:	RESPIRATORY RATE:
TEMPERATURE:	PALLOR:	JAUNDICE:
CYANOSIS:	JVP:	CLUBBING:
OEDEMA:	LYMPHADENOPATHY:	TRACHEA:
BREATH HODING TIME:	THYROMENTAL DISTANCE:	
MOUTH OPENING:	DENTAL STATUS:	
TEMPOROMANDIBULAR JOINT MOBILITY:		MALLAMPATTI SCORE:

ASA GRADE:

SIGNATURE OF CANDIDATE **SIGNATURE OF SUPERVISOR**

SYSTEMIC EXAMINATION

CHEST:

CARDIOVASCULAR SYSTEM:

CENTRAL NERVOUS SYSTEM:

ABDOMEN:

INVESTIGATION: **DATE** **REPORT**

Hb

TLC

PLATELETS

PT/ INR

RBS

INTRAOPERATIVE VITALS:

	Heart Rate (bpm)	**Systolic Arterial Pressure (mmHg)**	**Diastolic Arterial Pressure (mmHg)**	**Mean Arterial Pressure (mmHg)**	**Peripheral Oxygen Saturation (%)**	**Respiratory Rate (per min)**
Baseline (Pre-induction)						
10 Min.						
20 Min.						
30 Min.						
40 Min.						
50 Min.						
1 hour						
1h10Min						
1h20Min						
1h30Min						
1h40Min						
1h50Min						
2hours						
2h10Min						
2h20Min						
2h30Min						

SIGNATURE OF CANDIDATE **SIGNATURE OF SUPERVISOR**

TIME OF ANALGESIC REQUIREMENT

Time when patient complaints of pain									
VAS									

TIME TO FIRST RESCUE ANALGESIC CONSUMPTION-

SIGNATURE OF CANDIDATE **SIGNATURE OF SUPERVISOR**

POST OPERATIVE VITALS:

	Heart Rate (bpm)	Systolic Arterial Pressure (mmHg)	Diastolic Arterial Pressure (mmHg)	Mean Arterial Pressure (mmHg)	Peripheral Oxygen Saturation (%)	Respiratory Rate (per min)
Baseline						
10						
20						
30						
40						
50						
60						
1h 30m						
2h						
2h 30m						
3h						
4h						
5h						
6h						
7h						
8h						
9h						
10h						
11h						
12h						
13h						
14h						
15h						
16h						
17h						
18h						
19h						
20h						
21h						
22h						
23h						
24h						

SIGNATURE OF CANDIDATE **SIGNATURE OF SUPERVISOR**

SIDE EFFECTS IF ANY:

Side effect	**Treatment given**
Nausea and Vomiting	
Skin rash	
Tachycardia HR>100 per min	
Bradycardia HR<50 per min	
Hypotension SAP <90mmHg	
Sedation	
Others	

SIGNATURE OF CANDIDATE **SIGNATURE OF SUPERVISOR**

Sr. No	MRD No	Group	Age	Weight	Height	ASA grading	BMI	Duration of surgery	Pre-op_Heart rate (per minute)	Pre-op_ systolic blood pressure (mmHg)	Pre-op_ Diastolic blood pressure (mmHg)	Pre-op_Mean arterial pressure (mmHg)	Pre-op Peripheral saturation (SpO2)	Pre-op_ Resp rate (per minute)	HR_ Immediately in recovery room	HR_2 hours	HR_4 hours	HR_6 hours	HR_8 hours	HR_10 hours	HR_12 hours	HR_16 hours	HR_20 hours	HR_24 hours	SBP_ Immediately in recovery room
1	854814	B	26	85	160	II	33.2	80	90	124	80	94	97	14	96	100	70	76	82	-	-	-	-	-	124
2	885970	B	26	50	155	II	20.81	60	86	130	80	97	98	14	88	96	94	95	97	-	-	-	-	-	135
3	718984	B	25	60	150	II	26.66	60	86	130	80	97	97	14	100	95	96	92	94	-	-	-	-	-	142
4	558647	A	30	72	157	II	29.21	60	90	126	90	102	98	12	96	92	92	90	-	-	-	-	-	-	150
5	893508	A	29	75	160	II	29.29	105	76	110	80	90	98	15	75	90	82	84	82	84	96	90	78	76	135
6	205296	A	33	86	160	II	33.59	70	80	130	90	103	98	15	64	66	68	66	68	-	-	-	-	-	120
7	831748	B	30	65	157	II	26.37	90	80	110	70	83	97	16	50	52	52	54	-	-	-	-	-	-	90
8	573370	A	27	71	160	II	27.73	120	72	120	70	87	97	16	96	86	78	76	-	-	-	-	-	-	160
9	899479	B	28	66	155	II	27.47	60	76	128	90	103	99	16	70	60	60	72	-	-	-	-	-	-	116
10	28785	B	24	74	160	II	28.9	55	86	130	84	99	97	16	96	94	88	90	84	-	-	-	-	-	138
11	692031	B	26	74	160	II	28.9	75	74	124	74	91	97	16	84	80	82	76	88	-	-	-	-	-	138
12	904150	A	27	62	155	II	25.8	60	74	130	70	90	98	14	92	90	88	86	-	-	-	-	-	-	140
13	9054	A	31	70	160	III	27.34	65	94	124	90	101	98	18	90	88	88	-	-	-	-	-	-	-	136
14	847910	B	28	80	165	III	29.38	65	78	110	60	77	97	16	74	76	74	72	70	-	-	-	-	-	147
15	919711	A	31	80	163	II	30.11	70	76	128	88	101	98	14	76	72	74	76	78	-	-	-	-	-	146
16	668448	B	30	65	158	II	26.03	60	90	130	88	102	98	14	60	57	62	64	60	62	64	-	-	-	130
17	834734	B	24	80	165	III	29.38	60	94	130	74	93	96	14	87	80	88	90	89	96	88	-	-	-	148
18	918725	A	30	85	163	II	31.99	90	86	130	70	90	98	14	94	88	84	-	-	-	-	-	-	-	140
19	356755	A	30	75	163	II	28.22	60	74	128	66	87	98	14	102	88	86	84	78	76	88	88	80	-	138
20	746576	A	30	50	158	III	20.02	70	86	130	70	90	97	14	94	90	88	86	88	90	94	84	-	-	146
21	125548	A	36	80	165	II	29.38	80	88	128	76	93	99	16	84	82	86	84	-	-	-	-	-	-	136
22	756645	A	30	57	155	II	23.72	60	86	128	74	92	99	14	94	90	88	86	84	-	-	-	-	-	138
23	920085	A	30	70	157	II	28.39	80	74	122	70	87	98	14	78	80	82	84	82	-	-	-	-	-	130
24	749160	A	23	50	155	II	20.81	120	78	130	74	93	99	16	94	86	82	78	76	76	78	-	-	-	148
25	550465	B	36	75	165	II	27.54	90	86	130	70	90	98	16	94	90	92	90	-	-	-	-	-	-	136
26	543295	A	26	65	155	II	27.05	60	90	128	80	96	99	14	96	94	92	84	-	-	-	-	-	-	134
27	145029	B	34	64	153	II	27.33	90	82	126	86	99	99	16	49	48	50	50	52	-	-	-	-	-	100
28	202980	A	24	90	165	III	33.05	75	100	130	90	103	97	16	112	96	96	-	-	-	-	-	-	-	140
29	666172	A	26	75	160	II	29.29	90	86	110	70	83	97	14	90	94	92	90	-	-	-	-	-	-	139
30	667353	A	34	80	163	II	30.11	70	84	130	80	97	97	14	96	94	94	92	100	90	92	-	-	-	140
31	650353	B	30	65	158	II	26.03	60	78	130	90	103	97	14	86	92	90	84	83	86	86	92	84	-	148
32	747998	B	32	65	150	II	28.88	60	76	128	70	89	98	14	90	84	80	82	-	-	-	-	-	-	130
33	746079	A	26	65	155	II	27.05	70	86	120	70	87	97	12	96	92	90	90	88	-	-	-	-	-	138
34	746576	B	30	55	155	II	22.89	70	74	130	70	90	96	12	88	90	94	90	90	-	-	-	-	-	130
35	750120	B	31	80	165	III	29.38	75	90	130	70	90	98	14	98	94	92	92	90	96	-	-	-	-	140
36	684084	B	24	80	165	II	29.38	60	84	130	70	90	97	12	50	49	51	52	-	-	-	-	-	-	90
37	924160	A	25	80	160	II	31.25	60	64	124	74	91	97	12	86	84	80	94	-	-	-	-	-	-	130
38	692044	B	28	75	160	II	29.29	70	82	130	90	103	94	14	94	88	86	84	82	-	-	-	-	-	140
39	623837	B	29	85	165	III	31.22	70	70	130	70	90	98	14	88	94	90	86	82	-	-	-	-	-	130
40	729787	B	27	70	167	II	25.1	70	72	110	70	83	98	14	86	88	86	84	82	84	84	-	-	-	130
41	693968	B	33	50	155	II	20.81	50	90	130	70	90	97	12	88	90	86	84	-	-	-	-	-	-	134
42	804845	A	30	60	155	II	24.97	60	88	130	70	90	97	12	100	88	84	82	-	-	-	-	-	-	140
43	778247	A	29	55	157	II	22.31	65	80	120	70	86	97	12	84	82	-	-	-	-	-	-	-	-	130
44	913004	A	26	75	160	II	29.29	75	94	128	90	103	98	14	86	84	80	78	-	-	-	-	-	-	134
45	677194	A	29	77	145	III	36.62	60	61	130	70	90	97	15	80	96	90	90	88	74	70	68	-	-	140
46	696590	B	37	75	160	II	29.28	60	82	118	76	90	97	12	78	80	84	82	-	-	-	-	-	-	120
47	752184	B	26	65	140	II	33.16	60	82	130	70	90	98	14	94	92	90	84	80	-	-	-	-	-	140
48	648201	A	30	48	145	II	22.82	70	66	130	80	97	97	12	84	86	82	84	80	78	-	-	-	-	130
49	9054	B	31	70	163	II	26.34	75	78	130	80	97	98	12	76	80	84	-	-	-	-	-	-	-	140
50	436485	B	35	70	160	II	27.34	85	90	128	90	103	98	14	90	88	86	80	-	-	-	-	-	-	136
51	736493	A	34	80	155	III	33.29	80	68	110	70	83	98	12	80	84	90	88	86	96	88	84	94	86	130
52	335457	B	27	75	160	II	29.29	70	78	120	70	86	98	16	80	78	70	80	76	70	-	-	-	-	130
53	753448	B	24	65	157	II	26.37	70	88	128	100	109	97	12	90	88	86	-	-	-	-	-	-	-	140
54	248748	B	28	65	157	II	26.37	70	90	130	80	97	95	16	86	84	80	84	-	-	-	-	-	-	130

Sr. No	MRD No	Group	SBP_2 hours	SBP_4 hours	SBP_6 hours	SBP_8 hours	SBP_10 hours	SBP_12 hours	SBP_16 hours	SBP_20 hours	SBP_24 hours	DBP_ Immediately in recovery room	DBP_2 hours	DBP_4 hours	DBP_6 hours	DBP_8 hours	DBP_10 hours	DBP_12 hours	DBP_16 hours	DBP_20 hours	DBP_24 hours	MAP_ Immediately in recovery room	MAP_2 hours	MAP_4 hours	MAP_6 hours	MAP_8 hours
1	854814	B	130	130	126	128	-	-	-	-	-	80	90	70	70	78	-	-	-	-	-	95	103	90	88	95
2	885970	B	130	132	130	132	-	-	-	-	-	82	78	76	74	74	-	-	-	-	-	96	97	97	92	94
3	718984	B	140	138	136	140	-	-	-	-	-	90	90	88	86	84	-	-	-	-	-	86	74	104	102	102
4	558647	A	140	138	138	-	-	-	-	-	-	86	84	86	88	-	-	-	-	-	-	107	102	103	104	-
5	893508	A	132	130	128	130	128	140	130	128	126	57	58	60	56	60	60	62	60	58	58	83	82	83	80	83
6	205296	A	118	116	118	120	-	-	-	-	-	74	78	74	72	74	-	-	-	-	-	89	91	88	87	89
7	831748	B	100	106	100	108	-	-	-	-	-	50	56	60	54	60	-	-	-	-	-	63	71	75	69	76
8	573370	A	150	136	138	-	-	-	-	-	-	78	68	60	68	-	-	-	-	-	-	105	95	85	91	-
9	899479	B	126	126	124	-	-	-	-	-	-	66	70	70	70	-	-	-	-	-	-	82	88	88	88	-
10	28785	B	136	132	134	128	-	-	-	-	-	78	76	70	90	76	-	-	-	-	-	98	96	90	104	93
11	692031	B	132	134	132	139	-	-	-	-	-	80	76	80	74	86	-	-	-	-	-	99	94	98	93	103
12	904150	A	138	134	136	-	-	-	-	-	-	97	97	95	97	-	-	-	-	-	-	100	99	100	98	-
13	9054	A	138	136	-	-	-	-	-	-	-	88	86	86	-	-	-	-	-	-	-	104	103	102	-	-
14	847910	B	140	142	136	138	-	-	-	-	-	100	90	90	84	82	-	-	-	-	-	115	106	107	101	100
15	919711	A	144	132	130	136	-	-	-	-	-	84	82	88	86	66	-	-	-	-	-	104	102	102	100	89
16	668448	B	143	140	136	134	133	132	-	-	-	80	89	86	80	76	74	70	-	-	-	96	107	104	98	95
17	834734	B	136	134	130	134	138	134	-	-	-	90	76	74	70	69	79	77	-	-	-	109	96	94	90	90
18	918725	A	132	132	130	-	-	-	-	-	-	80	86	80	80	-	-	-	-	-	-	100	101	97	-	-
19	356755	A	132	134	136	134	132	140	136	132	-	67	68	66	66	74	70	74	70	72	-	90	89	88	89	94
20	746576	A	138	136	134	136	134	140	130	-	-	98	90	88	86	84	86	90	80	-	-	114	106	104	102	101
21	125548	A	132	134	130	-	-	-	-	-	-	88	84	86	84	-	-	-	-	-	-	104	100	102	99	-
22	756645	A	136	134	128	130	-	-	-	-	-	84	82	84	78	76	-	-	-	-	-	102	100	100	94	94
23	920085	A	128	130	128	126	-	-	-	-	-	70	76	72	72	70	-	-	-	-	-	90	93	91	90	88
24	749160	A	140	136	132	128	130	132	-	-	-	92	90	86	80	90	90	92	-	-	-	110	106	102	97	102
25	550465	B	132	130	128	-	-	-	-	-	-	76	74	70	84	-	-	-	-	-	-	96	93	90	98	-
26	543295	A	132	130	128	-	-	-	-	-	-	76	72	68	66	-	-	-	-	-	-	95	92	88	86	-
27	145029	B	100	104	108	100	-	-	-	-	-	50	52	54	52	50	-	-	-	-	-	67	68	71	71	67
28	202980	A	138	136	-	-	-	-	-	-	-	96	94	88	-	-	-	-	-	-	-	80	110	108	-	-
29	666172	A	140	138	136	-	-	-	-	-	-	86	88	86	76	-	-	-	-	-	-	104	105	103	96	-
30	667353	A	138	130	126	140	120	124	-	-	-	90	86	80	80	90	80	84	-	-	-	106	103	96	95	106
31	650353	B	140	138	136	132	134	132	144	136	-	92	86	84	86	88	86	88	80	80	-	110	104	102	102	102
32	747998	B	126	124	122	-	-	-	-	-	-	76	74	72	72	-	-	-	-	-	-	94	91	89	88	-
33	746079	A	136	134	130	126	-	-	-	-	-	90	90	90	80	80	-	-	-	-	-	106	105	104	96	95
34	746576	B	126	124	120	130	-	-	-	-	-	60	80	76	80	70	-	-	-	-	-	83	95	92	93	90
35	750120	B	136	130	130	126	140	-	-	-	-	90	80	80	80	70	90	-	-	-	-	106	98	96	96	88
36	684084	B	90	96	100	-	-	-	-	-	-	50	50	54	60	-	-	-	-	-	-	63	63	68	73	-
37	924160	A	128	120	140	-	-	-	-	-	-	80	74	70	90	-	-	-	-	-	-	96	92	86	106	-
38	692044	B	130	126	134	136	-	-	-	-	-	90	90	90	84	80	-	-	-	-	-	106	103	102	100	98
39	623837	B	140	124	130	124	-	-	-	-	-	70	90	70	70	74	-	-	-	-	-	90	106	88	90	90
40	729787	B	128	126	132	134	126	124	-	-	-	70	74	78	72	72	74	70	-	-	-	90	92	94	92	92
41	693968	B	128	124	124	-	-	-	-	-	-	74	76	74	72	-	-	-	-	-	-	94	93	90	89	-
42	804845	A	130	126	124	-	-	-	-	-	-	90	80	80	80	-	-	-	-	-	-	106	96	95	94	-
43	778247	A	120	-	-	-	-	-	-	-	-	70	70	-	-	-	-	-	-	-	-	90	88	-	-	-
44	913004	A	130	126	124	-	-	-	-	-	-	74	70	64	60	-	-	-	-	-	-	94	90	84	81	-
45	677194	A	150	130	128	120	130	128	126	-	-	90	80	70	80	80	80	80	70	-	-	106	103	90	96	93
46	696590	B	130	128	126	-	-	-	-	-	-	86	70	80	82	-	-	-	-	-	-	97	90	96	96	-
47	752184	B	130	130	126	120	-	-	-	-	-	70	80	70	74	70	-	-	-	-	-	93	96	90	91	86
48	648201	A	140	130	126	130	140	-	-	-	-	80	80	70	70	68	70	-	-	-	-	96	100	90	88	88
49	9054	B	130	128	-	-	-	-	-	-	-	80	90	80	-	-	-	-	-	-	-	100	103	96	-	-
50	436485	B	134	130	128	-	-	-	-	-	-	74	70	66	70	-	-	-	-	-	-	94	91	87	89	-
51	736493	A	128	126	130	140	138	130	124	134	122	70	76	80	70	80	80	70	74	74	72	90	93	95	90	100
52	335457	B	120	130	110	120	110	-	-	-	-	70	70	70	80	80	90	-	-	-	-	90	86	90	90	93
53	753448	B	136	132	-	-	-	-	-	-	-	80	80	82	-	-	-	-	-	-	-	100	98	98	-	-
54	248748	B	128	120	130	-	-	-	-	-	-	84	86	90	70	-	-	-	-	-	-	99	100	100	90	-

Sr. No	MRD No	Group	MAP_10 hours	MAP_12 hours	MAP_16 hours	MAP_20 hours	MAP_24 hours	SPO2_ Immediately in recovery room	SPO2_2 hours	SPO2_4 hours	SPO2_6 hours	SPO2_8 hours	SPO2_10 hours	SPO2_12 hours	SPO2_16 hours	SPO2_20 hours	SPO2_24 hours	RR_ Immediately in recovery room	RR_2 hours	RR_4 hours	RR_6 hours	RR_8 hours	RR_10 hours	RR_12 hours	RR_16 hours
1	854814	B	-	-	-	-	-	98	100	96	97	98	-	-	-	-	-	14	14	14	14	12	-	-	-
2	885970	B	-	-	-	-	-	98	97	97	97	97	-	-	-	-	-	20	18	16	16	16	-	-	-
3	718984	B	-	-	-	-	-	100	95	95	95	95	-	-	-	-	-	16	16	16	16	16	-	-	-
4	558647	A	-	-	-	-	-	96	96	97	97	-	-	-	-	-	-	16	14	14	14	-	-	-	-
5	893508	A	82	88	83	81	80	97	99	98	98	98	98	99	99	99	99	14	14	16	16	16	16	16	14
6	205296	A	-	-	-	-	-	98	98	97	98	98	-	-	-	-	-	20	20	20	18	18	-	-	-
7	831748	B	-	-	-	-	-	100	100	100	100	100	-	-	-	-	-	20	20	20	18	18	-	-	-
8	573370	A	-	-	-	-	-	99	98	97	97	-	-	-	-	-	-	20	20	18	18	-	-	-	-
9	899479	B	-	-	-	-	-	97	98	97	97	-	-	-	-	-	-	20	18	18	18	-	-	-	-
10	28785	B	-	-	-	-	-	97	97	96	96	97	-	-	-	-	-	20	20	18	18	18	-	-	-
11	692031	B	-	-	-	-	-	96	97	96	96	97	-	-	-	-	-	20	20	18	18	20	-	-	-
12	904150	A	-	-	-	-	-	96	97	97	97	-	-	-	-	-	-	18	18	18	18	-	-	-	-
13	9054	A	-	-	-	-	-	98	98	98	-	-	-	-	-	-	-	20	18	18	-	-	-	-	-
14	847910	B	-	-	-	-	-	97	97	97	97	96	-	-	-	-	-	18	18	18	16	18	-	-	-
15	919711	A	-	-	-	-	-	91	91	92	92	96	-	-	-	-	-	20	20	18	18	18	-	-	-
16	668448	B	93	90	-	-	-	98	100	100	100	100	100	98	-	-	-	16	16	14	14	14	14	14	-
17	834734	B	98	96	-	-	-	97	98	98	98	98	98	96	-	-	-	18	16	16	16	16	18	18	-
18	918725	A	-	-	-	-	-	99	99	99	-	-	-	-	-	-	-	16	14	14	-	-	-	-	-
19	356755	A	90	96	92	92	-	99	99	99	99	98	99	99	99	99	-	16	14	14	16	16	16	16	16
20	746576	A	102	106	96	-	-	99	99	99	99	99	99	99	99	-	-	16	16	16	16	16	16	16	16
21	125548	A	-	-	-	-	-	98	98	98	98	-	-	-	-	-	-	16	16	16	16	-	-	-	-
22	756645	A	-	-	-	-	-	99	99	99	99	99	-	-	-	-	-	16	16	14	14	14	-	-	-
23	920085	A	-	-	-	-	-	99	99	99	99	99	-	-	-	-	-	16	14	14	14	14	-	-	-
24	749160	A	103	105	-	-	-	99	99	99	99	99	99	99	-	-	-	16	16	16	16	16	14	14	-
25	550465	B	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	16	16	14	14	-	-	-	-
26	543295	A	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	16	16	14	14	-	-	-	-
27	145029	B	-	-	-	-	-	99	99	99	99	99	-	-	-	-	-	16	14	14	12	12	-	-	-
28	202980	A	-	-	-	-	-	97	99	99	-	-	-	-	-	-	-	18	16	14	-	-	-	-	-
29	666172	A	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	16	16	16	14	-	-	-	-
30	667353	A	93	97	-	-	-	97	97	96	96	95	96	96	-	-	-	14	14	14	14	16	14	14	-
31	650353	B	102	102	101	99	-	98	99	98	99	99	97	97	99	99	-	18	16	16	16	16	16	16	16
32	747998	B	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	18	18	14	14	-	-	-	-
33	746079	A	97	93	93	93	-	99	99	99	99	99	99	99	99	99	99	14	14	14	14	14	14	12	12
34	746576	B	-	-	-	-	-	99	99	99	97	97	-	-	-	-	-	14	12	12	12	14	-	-	-
35	750120	B	106	-	-	-	-	97	96	97	97	97	97	-	-	-	-	16	14	14	14	12	16	-	-
36	684084	B	-	-	-	-	-	95	95	95	95	-	-	-	-	-	-	16	14	14	14	-	-	-	-
37	924160	A	-	-	-	-	-	96	96	97	96	-	-	-	-	-	-	14	14	12	14	-	-	-	-
38	692044	B	-	-	-	-	-	99	99	99	99	99	-	-	-	-	-	14	12	12	12	12	-	-	-
39	623837	B	-	-	-	-	-	99	99	99	99	99	-	-	-	-	-	14	16	14	14	12	-	-	-
40	729787	B	91	88	-	-	-	99	99	99	99	99	99	99	-	-	-	14	14	14	14	14	14	14	-
41	693968	B	-	-	-	-	-	97	97	97	97	-	-	-	-	-	-	14	14	14	14	-	-	-	-
42	804845	A	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	12	12	12	12	-	-	-	-
43	778247	A	-	-	-	-	-	99	99	-	-	-	-	-	-	-	-	14	12	-	-	-	-	-	-
44	913004	A	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	12	12	12	12	-	-	-	-
45	677194	A	96	96	88	-	-	97	99	96	96	96	96	96	97	-	-	14	16	14	14	12	12	12	12
46	696590	B	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	16	14	14	14	-	-	-	-
47	752184	B	-	-	-	-	-	99	98	97	97	97	-	-	-	-	-	14	12	12	12	12	-	-	-
48	648201	A	93	-	-	-	-	96	97	96	96	95	96	-	-	-	-	12	12	12	12	12	12	-	-
49	9054	B	-	-	-	-	-	99	99	99	-	-	-	-	-	-	-	14	12	12	-	-	-	-	-
50	436485	B	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	14	12	12	12	-	-	-	-
51	736493	A	99	90	90	94	88	99	99	99	99	99	99	99	99	99	99	12	12	12	12	12	14	14	12
52	335457	B	96	-	-	-	-	97	96	96	96	96	96	-	-	-	-	12	12	12	12	12	12	-	-
53	753448	B	-	-	-	-	-	99	99	99	-	-	-	-	-	-	-	14	12	12	-	-	-	-	-
54	248748	B	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	14	14	12	12	-	-	-	-

Sr. No	MRD No	Group	RR_20 hours	RR_24 hours	VAS_ Immediately in recovery room	VAS_1 hours	VAS_2 hours	VAS_3 hours	VAS_4 hours	VAS_5 hour	6hr	7hr	8hr	9hr	10 hr	11hr	18 hr	19hr	20 hr	self reporting of pain	VAS_Time when patient complains of pain VAS>/=3	Time to first rescue analgesic consumption	Adverse effects if any
1	854814	B	-	-	0	0	0	0	0	0	0	1	2	-	-	-	-	-	-	420(1)	B	485	-
2	885970	B	-	-	0	0	0	0	0	0	0	1	4	-	-	-	-	-	-	410(1)	B	480	-
3	718984	B	-	-	0	0	0	0	0	0	0	1	3	-	-	-	-	-	-	415(1)	B	480	-
4	558647	A	-	-	0	0	0	0	0	0	0	1	2	-	-	-	-	-	-	400(1)	A	510	-
5	893508	A	16	16	0	0	0	0	0	0	0	2	2	2	-	-	-	-	-	420(2)	A	560	-
6	205296	A	-	-	0	0	0	2	-	-	-	-	-	-	-	-	-	-	-	180(2)	A	205	-
7	831748	B	-	-	0	0	0	0	0	0	0	0	2	-	-	-	-	-	-	480(2)	B	520	bradycardia, hypotension
8	573370	A	-	-	0	0	0	0	2	-	-	-	-	-	-	-	-	-	-	240(2)	A	280	-
9	899479	B	-	-	0	0	0	0	0	0	0	0	1	-	-	-	-	-	-	470(1)	B	535	-
10	28785	B	-	-	0	0	0	0	1	1	-	-	-	-	-	-	-	-	-	235(1)	B	350	-
11	692031	B	-	-	0	0	0	0	0	0	0	1	-	-	-	-	-	-	-	420(1)	B	425	-
12	904150	A	-	-	0	0	0	0	0	1	-	-	-	-	-	-	-	-	-	300(1)	A	335	-
13	9054	A	-	-	0	0	2	-	-	-	-	-	-	-	-	-	-	-	-	120(2)	A	145	-
14	847910	B	-	-	0	0	0	0	0	0	0	2	4	-	-	-	-	-	-	420(2)	B	480	-
15	919711	A	-	-	0	0	0	0	0	0	2	2	-	-	-	-	-	-	-	360(2)	A	440	-
16	668448	B	-	-	0	0	0	0	0	0	0	0	1	2	2	-	-	-	-	480(1)	B	645	-
17	834734	B	-	-	0	0	0	0	0	0	0	0	0	2	2	-	-	-	-	540(2)	B	610	-
18	918725	A	-	-	0	0	0	0	2	2	4	-	-	-	-	-	-	-	-	240(2)	A	300	-
19	356755	A	14	-	0	0	0	0	0	0	0	0	0	0	0	0	2	-	-	1080(2)	A	1180	-
20	746576	A	-	-	0	0	0	0	0	1	-	-	-	-	-	-	-	-	-	295(1)	A	350	-
21	125548	A	-	-	0	0	0	1	2	-	-	-	-	-	-	-	-	-	-	180(1)	A	260	-
22	756645	A	-	-	0	0	0	0	0	0	0	2	4	-	-	-	-	-	-	420(2)	A	480	-
23	920085	A	-	-	0	0	0	0	0	0	2	-	-	-	-	-	-	-	-	360(2)	A	390	-
24	749160	A	-	-	0	0	0	0	0	0	0	0	0	1	1	3	-	-	-	530(1)	A	660	-
25	550465	B	-	-	0	0	0	0	0	2	4	-	-	-	-	-	-	-	-	300(2)	B	360	-
26	543295	A	-	-	0	0	0	1	2	2	-	-	-	-	-	-	-	-	-	180(1)	A	345	-
27	145029	B	-	-	0	0	0	0	0	0	0	1	1	-	-	-	-	-	-	460(1)	B	490	bradycardia, hypotension
28	202980	A	-	-	0	0	2	2	-	-	-	-	-	-	-	-	-	-	-	120(2)	A	200	-
29	666172	A	-	-	0	0	0	1	2	-	-	-	-	-	-	-	-	-	-	175(1)	A	295	-
30	667353	A	-	-	0	0	0	0	0	0	0	0	0	0	0	2	-	-	-	660(2)	A	690	-
31	650353	B	16	-	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1080(1)	B	1240	-
32	747998	B	-	-	0	0	0	0	0	1	4	-	-	-	-	-	-	-	-	295(1)	B	360	-
33	746079	A	12	-	0	0	0	0	0	2	2	-	-	-	-	-	-	-	-	300(2)	A	395	-
34	746576	B	-	-	0	0	0	0	0	0	1	1	-	-	-	-	-	-	-	350(1)	B	450	-
35	750120	B	-	-	0	0	0	0	0	0	0	0	2	4	-	-	-	-	-	480(2)	B	540	-
36	684084	B	-	-	0	0	0	0	0	1	4	-	-	-	-	-	-	-	-	300(1)	B	360	bradycardia, hypotension
37	924160	A	-	-	0	0	0	0	1	2	4	-	-	-	-	-	-	-	-	235(1)	A	360	-
38	692044	B	-	-	0	0	0	0	0	0	1	4	-	-	-	-	-	-	-	360(1)	B	420	-
39	623837	B	-	-	0	0	0	0	0	0	0	1	-	-	-	-	-	-	-	415(10	B	450	-
40	729787	B	-	-	0	0	0	0	0	0	0	0	0	1	1	-	-	-	-	540(1)	B	655	-
41	693968	B	-	-	0	0	0	0	1	3	-	-	-	-	-	-	-	-	-	235(1)	B	300	-
42	804845	A	-	-	0	0	0	0	1	2	-	-	-	-	-	-	-	-	-	230(1)	A	320	-
43	778247	A	-	-	0	1	-	-	-	-	-	-	-	-	-	-	-	-	-	60(1)	A	75	-
44	913004	A	-	-	0	0	0	0	0	2	2	-	-	-	-	-	-	-	-	300(2)	A	375	-
45	677194	A	-	-	0	0	0	0	0	0	0	-	0	0	1	2	-	-	-	590(1)	A	690	-
46	696590	B	-	-	0	0	0	0	0	1	3	-	-	-	-	-	-	-	-	295(1)	B	360	-
47	752184	B	-	-	0	0	0	0	0	0	0	1	-	-	-	-	-	-	-	420(1)	B	435	-
48	648201	A	-	-	0	0	0	0	0	0	0	1	2	-	-	-	-	-	-	410(1)	A	510	-
49	9054	B	-	-	0	0	2	0	0	0	0	2	-	-	-	-	-	-	-	420(2)	B	445	-
50	436485	B	-	-	0	0	0	0	0	2	-	-	-	-	-	-	-	-	-	300(2)	B	315	-
51	736493	A	14	12	0	0	0	0	0	0	0	2	-	-	-	-	-	-	-	420(2)	A	470	-
52	335457	B	-	-	0	0	0	0	0	0	0	0	0	1	3	-	-	-	-	540(1)	B	600	-
53	753448	B	-	-	0	0	0	2	3	-	-	-	-	-	-	-	-	-	-	180(1)	B	240	-
54	248748	B	-	-	0	0	0	0	1	2	-	-	-	-	-	-	-	-	-	240(1)	B	330	-

Sr. No	MRD No	Group	Age	Weight	Height	ASA grading	BMI	Duration of surgery	Pre-op_Heart rate (per minute)	Pre-op_ systolic blood pressure (mmHg)	Pre-op_ Diastolic blood pressure (mmHg)	Pre-op_Mean arterial pressure (mmHg)	Pre-op Peripheral saturation (SpO2)	Pre-op_ Resp rate (per minute)	HR_ Immediately in recovery room	HR_2 hours	HR_4 hours	HR_6 hours	HR_8 hours	HR_10 hours	HR_12 hours	HR_16 hours	HR_20 hours	HR_24 hours	SBP_ Immediately in recovery room
55	532604	B	26	75	163	II	28.22	100	78	120	70	86	97	12	90	88	86	84	82	86	96	84	80	70	130
56	756664	B	29	75	163	III	28.23	80	92	126	70	89	97	14	98	94	92	90	-	-	-	-	-	-	150
57	780587	B	28	80	165	II	29.38	60	84	130	70	90	97	16	96	92	90	84	86	94	-	-	-	-	140
58	730419	A	28	70	155	II	29.13	70	74	130	60	83	97	14	90	84	82	80	78	76	-	-	-	-	140
59	668754	B	39	80	157	II	32.45	90	74	120	70	86	97	14	50	51	52	54	53	52	-	-	-	-	94
60	356755	A	30	75	160	II	29.29	100	84	128	70	89	98	14	96	94	88	84	-	-	-	-	-	-	142
61	129450	B	28	70	160	II	27.34	70	66	110	60	77	97	12	96	90	84	80	-	-	-	-	-	-	130
62	232859	A	30	85	163	II	31.99	90	74	130	90	103	98	14	96	92	90	88	-	-	-	-	-	-	142
63	669853	B	27	75	155	II	31.21	90	87	130	90	103	97	14	102	94	90	88	86	90	94	88	84	82	146
64	751366	A	32	45	145	II	21.4	65	88	120	70	86	98	12	76	74	72	74	72	70	72	70	68	-	130
65	752237	B	27	65	155	II	27.05	75	90	132	90	104	98	14	100	92	90	92	96	-	-	-	-	-	154
66	622478	A	33	80	157	II	32.45	60	84	110	60	77	97	14	86	80	84	96	94	-	-	-	-	-	126
67	847881	B	29	75	163	II	28.22	60	94	100	70	80	98	14	106	96	94	90	86	-	-	-	-	-	130
68	850941	B	24	60	155	III	24.97	60	85	120	80	93	98	14	90	92	90	86	84	-	-	-	-	-	136
69	802941	B	30	70	160	II	27.34	60	78	100	70	80	100	14	86	84	82	80	78	-	-	-	-	-	132
70	820040	B	29	70	163	II	26.35	65	86	130	80	97	98	14	88	90	86	82	84	-	-	-	-	-	132
71	155134	B	36	85	160	II	33.2	60	72	122	90	101	98	14	94	90	88	86	84	84	-	-	-	-	154
72	837627	B	22	80	160	II	31.25	60	68	110	70	83	98	14	80	76	74	76	-	-	-	-	-	-	130
73	842798	B	28	70	162	II	26.67	75	82	130	80	97	98	14	90	96	90	84	86	84	90	-	-	-	142
74	841502	A	22	80	160	II	31.25	55	78	128	90	103	98	14	84	80	82	84	80	78	76	-	-	-	152
75	188549	B	27	60	155	II	24.97	65	76	110	80	90	97	14	84	82	80	78	-	-	-	-	-	-	128
76	847414	A	38	55	155	II	22.89	70	78	110	60	77	99	14	90	94	86	84	84	86	-	-	-	-	130
77	848712	A	34	80	162	II	30.48	70	76	110	70	83	99	16	86	82	80	76	74	-	-	-	-	-	130
78	848866	A	36	75	160	II	29.29	65	74	110	80	90	96	14	84	80	76	-	-	-	-	-	-	-	130
79	103571	B	29	70	160	II	27.34	70	62	110	70	83	99	14	49	48	49	52	53	50	-	-	-	-	92
80	837533	B	32	80	165	II	29.38	60	74	130	90	103	98	14	90	84	80	78	78	-	-	-	-	-	140
81	848555	A	30	57	155	II	23.72	65	60	100	70	80	98	12	78	80	76	80	-	-	-	-	-	-	128
82	172189	A	28	65	155	II	27.05	60	72	128	80	96	98	14	86	80	78	76	74	72	-	-	-	-	150
83	319097	A	31	81	160	II	31.64	70	90	130	90	103	98	14	92	90	92	88	-	-	-	-	-	-	140
84	852029	B	29	80	163	III	30.11	70	74	130	90	103	99	16	86	84	82	80	84	-	-	-	-	-	142
85	697554	B	28	65	160	II	25.3	65	66	110	70	83	98	14	82	80	76	74	-	-	-	-	-	-	126
86	844706	A	30	65	155	II	27.05	75	75	100	60	73	97	16	76	74	70	72	-	-	-	-	-	-	120
87	232859	A	22	60	155	II	24.97	60	84	120	80	93	99	16	94	90	88	80	-	-	-	-	-	-	136
88	928720	A	29	70	160	II	29.29	70	84	130	80	97	98	14	96	90	84	82	-	-	-	-	-	-	140
89	881673	A	30	80	160	II	31.25	80	80	100	70	80	98	14	82	80	78	74	76	-	-	-	-	-	124
90	696813	A	28	57	155	II	23.72	70	72	110	70	83	98	16	100	94	92	90	86	-	-	-	-	-	130
91	797348	A	25	75	160	II	29.29	65	72	130	70	90	98	16	82	76	80	70	-	-	-	-	-	-	132
92	888006	A	24	65	157	II	26.57	90	74	130	90	103	99	14	96	98	94	92	-	-	-	-	-	-	150
93	440309	A	30	55	157	II	22.31	70	86	120	70	87	97	14	84	82	80	78	76	-	-	-	-	-	130
94	731893	A	31	60	155	II	24.97	60	82	126	72	90	99	16	96	94	92	90	86	-	-	-	-	-	132
95	882798	A	25	50	155	II	20.81	65	72	112	74	87	98	16	74	70	70	72	70	-	-	-	-	-	126
96	881673	A	28	60	150	II	26.66	60	84	120	80	93	99	16	86	94	90	88	80	-	-	-	-	-	136
97	888006	B	27	57	155	II	23.72	60	74	130	90	103	98	14	92	90	84	80	78	78	-	-	-	-	140
98	440309	B	30	65	160	II	25.3	70	62	110	70	83	99	14	86	90	70	72	70	68	72	-	-	-	130
99	882798	B	28	75	160	II	29.29	75	82	130	80	97	98	14	86	90	96	90	84	86	84	90	-	-	142
##	835627	A	29	65	155	II	27.05	65	60	100	70	80	98	12	80	78	80	76	80	-	-	-	-	-	128

Sr. No	MRD No	Group	SBP_2 hours	SBP_4 hours	SBP_6 hours	SBP_8 hours	SBP_10 hours	SBP_12 hours	SBP_16 hours	SBP_20 hours	SBP_24 hours	DBP_ Immediately in recovery room	DBP_2 hours	DBP_4 hours	DBP_6 hours	DBP_8 hours	DBP_10 hours	DBP_12 hours	DBP_16 hours	DBP_20 hours	DBP_24 hours	MAP_ Immediately in recovery room	MAP_2 hours	MAP_4 hours	MAP_6 hours	MAP_8 hours
55	532604	B	126	120	130	120	130	140	130	120	120	70	70	80	70	70	70	70	72	70	70	90	88	93	90	86
56	756664	B	140	140	130	-	-	-	-	-	-	90	90	70	70	-	-	-	-	-	-	111	107	93	90	-
57	780587	B	134	130	126	140	146	-	-	-	-	90	66	70	70	70	80	-	-	-	-	107	89	90	89	93
58	730419	A	130	126	124	126	130	-	-	-	-	70	70	70	70	70	76	-	-	-	-	93	90	89	88	89
59	668754	B	96	100	100	104	106	-	-	-	-	52	54	56	56	60	60	-	-	-	-	66	68	71	71	75
60	356755	A	140	138	130	-	-	-	-	-	-	76	70	72	70	-	-	-	-	-	-	98	93	94	90	-
61	129450	B	128	126	120	-	-	-	-	-	-	90	70	66	80	-	-	-	-	-	-	103	89	86	93	-
62	232859	A	136	132	134	-	-	-	-	-	-	86	79	78	74	-	-	-	-	-	-	105	98	96	94	-
63	669853	B	136	132	134	140	134	142	136	132	136	92	94	86	82	80	80	90	80	82	84	110	108	101	99	100
64	751366	A	128	126	130	124	122	118	120	120	-	70	72	70	70	70	68	70	68	70	-	90	91	89	90	88
65	752237	B	138	140	136	152	-	-	-	-	-	94	96	90	86	86	-	-	-	-	-	114	110	107	103	108
66	622478	A	122	126	130	132	-	-	-	-	-	76	74	76	80	74	-	-	-	-	-	93	90	93	97	93
67	847881	B	128	120	118	116	-	-	-	-	-	80	70	70	72	68	-	-	-	-	-	97	89	87	87	84
68	850941	B	130	126	124	122	-	-	-	-	-	80	70	70	68	68	-	-	-	-	-	99	90	89	87	86
69	802941	B	126	124	120	110	-	-	-	-	-	72	70	70	70	70	-	-	-	-	-	92	89	88	87	83
70	820040	B	136	130	126	120	-	-	-	-	-	90	92	90	84	80	-	-	-	-	-	104	107	103	98	93
71	155134	B	140	138	136	138	134	-	-	-	-	92	90	86	80	90	86	-	-	-	-	113	107	103	99	106
72	837627	B	128	126	124	-	-	-	-	-	-	70	72	70	70	-	-	-	-	-	-	90	91	89	88	-
73	842798	B	140	130	132	136	138	140	-	-	-	86	90	80	76	74	76	80	-	-	-	105	107	97	95	95
74	841502	A	142	140	142	134	140	136	-	-	-	88	84	80	82	90	80	82	-	-	-	109	103	100	102	105
75	188549	B	126	124	120	-	-	-	-	-	-	68	70	68	70	-	-	-	-	-	-	88	89	87	87	-
76	847414	A	132	128	126	126	128	-	-	-	-	90	92	84	84	84	84	-	-	-	-	103	105	99	98	98
77	848712	A	126	120	118	116	-	-	-	-	-	70	72	70	64	64	-	-	-	-	-	90	90	87	82	81
78	848866	A	130	128	-	-	-	-	-	-	-	78	70	72	-	-	-	-	-	-	-	95	90	91	-	-
79	103571	B	96	100	100	104	106	-	-	-	-	48	50	50	50	52	52	-	-	-	-	63	65	67	67	69
80	837533	B	136	130	124	126	-	-	-	-	-	90	86	80	84	86	-	-	-	-	-	107	103	97	97	99
81	848555	A	120	122	130	-	-	-	-	-	-	78	70	68	70	-	-	-	-	-	-	95	87	86	90	-
82	172189	A	144	142	144	140	138	-	-	-	-	94	90	86	84	80	76	-	-	-	-	113	108	105	104	100
83	319097	A	138	142	138	-	-	-	-	-	-	90	90	92	92	-	-	-	-	-	-	107	111	109	107	-
84	852029	B	136	132	136	132	-	-	-	-	-	90	86	84	82	84	-	-	-	-	-	107	103	100	100	100
85	697554	B	120	118	124	-	-	-	-	-	-	76	74	72	70	-	-	-	-	-	-	93	89	87	88	-
86	844706	A	110	120	116	-	-	-	-	-	-	76	70	70	68	-	-	-	-	-	-	91	83	87	84	-
87	232859	A	130	128	120	-	-	-	-	-	-	70	80	80	80	-	-	-	-	-	-	92	97	96	93	-
88	928720	A	138	134	136	-	-	-	-	-	-	90	90	84	82	-	-	-	-	-	-	107	106	101	100	-
89	881673	A	110	120	118	114	-	-	-	-	-	74	70	60	70	72	-	-	-	-	-	91	83	80	86	86
90	696813	A	126	124	120	130	-	-	-	-	-	90	86	84	80	70	-	-	-	-	-	103	99	97	93	90
91	797348	A	130	132	128	-	-	-	-	-	-	76	72	72	70	-	-	-	-	-	-	95	91	92	89	-
92	888006	A	156	150	148	-	-	-	-	-	-	90	96	86	80	-	-	-	-	-	-	110	116	107	103	-
93	440309	A	132	130	128	132	-	-	-	-	-	80	74	70	78	72	-	-	-	-	-	98	93	90	95	92
94	731893	A	130	128	126	132	-	-	-	-	-	78	74	74	70	74	-	-	-	-	-	96	93	92	89	93
95	882798	A	118	116	120	118	-	-	-	-	-	80	70	72	70	74	-	-	-	-	-	95	86	87	87	89
96	881673	A	130	128	120	-	-	-	-	-	-	70	80	80	80	-	-	-	-	-	-	92	97	96	93	-
97	888006	B	136	130	124	126	-	-	-	-	-	90	86	80	84	86	-	-	-	-	-	107	103	97	97	99
98	440309	B	120	118	116	118	116	-	-	-	-	70	70	70	68	70	68	-	-	-	-	90	87	86	84	86
99	882798	B	140	130	132	136	138	140	-	-	-	86	90	80	76	74	76	80	-	-	-	105	107	97	95	95
##	835627	A	120	122	130	-	-	-	-	-	-	78	70	68	70	-	-	-	-	-	-	95	87	86	90	-

Sr. No	MRD No	Group	MAP_10 hours	MAP_12 hours	MAP_16 hours	MAP_20 hours	MAP_24 hours	SPO2_ Immediately in recovery room	SPO2_2 hours	SPO2_4 hours	SPO2_6 hours	SPO2_8 hours	SPO2_10 hours	SPO2_12 hours	SPO2_16 hours	SPO2_20 hours	SPO2_24 hours	RR_ Immediately in recovery room	RR_2 hours	RR_4 hours	RR_6 hours	RR_8 hours	RR_10 hours	RR_12 hours	RR_16 hours
55	532604	B	90	93	91	87	86	99	99	99	99	99	99	98	98	98	99	12	12	12	12	12	12	14	12
56	756664	B	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	16	14	14	12	-	-	-	-
57	780587	B	102	-	-	-	-	99	99	99	99	99	97	-	-	-	-	16	14	14	12	14	16	-	-
58	730419	A	94	-	-	-	-	99	99	99	99	99	99	-	-	-	-	14	12	12	12	10	10	-	-
59	668754	B	75	-	-	-	-	99	99	99	99	97	98	-	-	-	-	14	14	12	12	14	12	-	-
60	356755	A	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	14	16	14	12	-	-	-	-
61	129450	B	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	16	14	12	12	-	-	-	-
62	232859	A	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	14	14	14	12	-	-	-	-
63	669853	B	98	107	99	99	101	99	99	99	99	99	99	99	99	99	99	16	14	12	12	12	12	14	12
64	751366	A	86	86	85	87	-	99	99	99	99	99	99	99	99	99	-	14	12	12	12	11	12	12	12
65	752237	B	-	-	-	-	-	98	98	98	98	98	-	-	-	-	-	16	14	14	12	16	-	-	-
66	622478	A	-	-	-	-	-	99	99	99	99	99	-	-	-	-	-	14	12	12	14	12	-	-	-
67	847881	B	-	-	-	-	-	99	99	99	99	99	-	-	-	-	-	16	14	12	12	12	-	-	-
68	850941	B	-	-	-	-	-	98	98	98	98	98	-	-	-	-	-	14	12	12	12	14	-	-	-
69	802941	B	-	-	-	-	-	99	99	99	99	99	-	-	-	-	-	16	14	14	14	14	-	-	-
70	820040	B	-	-	-	-	-	99	99	99	99	99	-	-	-	-	-	14	16	14	14	14	-	-	-
71	155134	B	102	-	-	-	-	99	99	99	99	99	99	-	-	-	-	16	14	14	14	14	14	-	-
72	837627	B	-	-	-	-	-	99	98	98	98	-	-	-	-	-	-	14	14	14	14	-	-	-	-
73	842798	B	97	100	-	-	-	99	98	99	99	99	99	98	-	-	-	14	16	14	14	14	14	16	-
74	841502	A	100	100	-	-	-	99	99	99	99	99	99	99	-	-	-	16	14	14	14	14	12	12	-
75	188549	B	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	14	14	14	14	-	-	-	-
76	847414	A	99	-	-	-	-	99	99	99	99	99	99	-	-	-	-	16	16	14	14	16	14	-	-
77	848712	A	-	-	-	-	-	99	99	99	98	97	-	-	-	-	-	18	16	14	14	14	-	-	-
78	848866	A	-	-	-	-	-	99	99	99	-	-	-	-	-	-	-	16	14	14	-	-	-	-	-
79	103571	B	70	-	-	-	-	99	99	99	99	98	98	-	-	-	-	14	14	14	14	14	14	-	-
80	837533	B	-	-	-	-	-	99	99	99	99	99	-	-	-	-	-	16	16	14	14	14	-	-	-
81	848555	A	-	-	-	-	-	97	97	97	97	-	-	-	-	-	-	18	16	16	16	-	-	-	-
82	172189	A	97	-	-	-	-	99	99	99	99	99	99	-	-	-	-	18	16	16	16	16	16	-	-
83	319097	A	-	-	-	-	-	98	98	98	98	-	-	-	-	-	-	16	16	16	16	-	-	-	-
84	852029	B	-	-	-	-	-	98	97	97	97	97	-	-	-	-	-	16	16	16	16	16	-	-	-
85	697554	B	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	18	16	16	14	-	-	-	-
86	844706	A	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	16	14	14	14	-	-	-	-
87	232859	A	-	-	-	-	-	98	98	98	98	-	-	-	-	-	-	14	14	14	14	-	-	-	-
88	928720	A	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	16	16	14	14	-	-	-	-
89	881673	A	-	-	-	-	-	98	98	98	98	98	-	-	-	-	-	18	16	16	16	16	-	-	-
90	696813	A	-	-	-	-	-	99	99	99	99	99	-	-	-	-	-	18	16	16	14	14	-	-	-
91	797348	A	-	-	-	-	-	98	98	98	98	-	-	-	-	-	-	16	14	14	14	-	-	-	-
92	888006	A	-	-	-	-	-	99	99	99	99	-	-	-	-	-	-	18	18	16	16	-	-	-	-
93	440309	A	-	-	-	-	-	98	98	98	98	98	-	-	-	-	-	14	14	14	14	14	-	-	-
94	731893	A	-	-	-	-	-	99	99	99	99	99	-	-	-	-	-	18	16	16	16	16	-	-	-
95	882798	A	-	-	-	-	-	99	99	99	99	99	-	-	-	-	-	18	18	16	16	16	-	-	-
96	881673	A	-	-	-	-	-	98	98	98	98	-	-	-	-	-	-	14	14	14	14	-	-	-	-
97	888006	B	-	-	-	-	-	99	99	99	99	99	-	-	-	-	-	16	16	14	14	14	-	-	-
98	440309	B	84	-	-	-	-	99	99	99	99	98	98	-	-	-	-	14	14	14	14	14	14	-	-
99	882798	B	97	100	-	-	-	99	98	99	99	99	99	98	-	-	-	14	16	14	14	14	14	16	-
##	835627	A	-	-	-	-	-	97	97	97	97	-	-	-	-	-	-	18	16	16	16	-	-	-	-

Sr. No	MRD No	Group	RR_20 hours	RR_24 hours	VAS_ Immediately in recovery room	VAS_1 hours	VAS_2 hours	VAS_3 hours	VAS_4 hours	VAS_5 hour	6hr	7hr	8hr	9hr	10 hr	11hr	18 hr	19hr	20 hr	self reporting of pain	VAS_Time when patient complains of pain VAS>/=3	Time to first rescue analgesic consumption	Adverse effects if any
55	532604	B	12	12	0	0	0	0	0	0	0	0	0	0	1	4	-	-	-	600(1)	B	660	-
56	756664	B	-	-	0	0	0	0	0	1	3	-	-	-	-	-	-	-	-	300(1)	B	360	-
57	780587	B	-	-	0	0	0	0	0	0	0	0	2	-	-	-	-	-	-	480(2)	B	500	-
58	730419	A	-	-	0	0	0	0	0	0	0	0	1	1	-	-	-	-	-	470(1)	A	570	-
59	668754	B	-	-	0	0	0	0	0	0	0	0	0	1	-	-	-	-	-	540(1)	B	560	bradycardia, hypotension
60	356755	A	-	-	0	0	0	0	2	-	-	-	-	-	-	-	-	-	-	240(2)	A	260	-
61	129450	B	-	-	0	0	0	0	2	-	-	-	-	-	-	-	-	-	-	240(2)	B	295	-
62	232859	A	-	-	0	0	2	-	-	-	-	-	-	-	-	-	-	-	-	120(2)	A	150	-
63	669853	B	12	12	0	0	0	0	0	0	0	0	0	1	3	-	-	-	-	530(1)	B	600	-
64	751366	A	12	-	0	0	0	0	0	0	0	0	0	0	0	0	2	-	-	1080(2)	A	1125	-
65	752237	B	-	-	0	0	0	0	0	0	0	2	-	-	-	-	-	-	-	420(2)	B	450	-
66	622478	A	-	-	0	0	0	0	0	1	1	-	-	-	-	-	-	-	-	300(1)	A	375	-
67	847881	B	-	-	0	0	0	0	0	0	1	4	-	-	-	-	-	-	-	360(1)	B	420	-
68	850941	B	-	-	0	0	0	0	0	1	1	-	-	-	-	-	-	-	-	300(1)	B	395	-
69	802941	B	-	-	0	0	0	0	0	0	0	0	1	-	-	-	-	-	-	480(1)	B	485	-
70	820040	B	-	-	0	0	0	0	0	0	0	1	-	-	-	-	-	-	-	420(1)	B	450	-
71	155134	B	-	-	0	0	0	0	0	0	0	0	1	3	-	-	-	-	-	480(1)	B	540	-
72	837627	B	-	-	0	0	0	1	2	-	-	-	-	-	-	-	-	-	-	180(1)	B	285	-
73	842798	B	-	-	0	0	0	0	0	0	0	0	0	1	1	-	-	-	-	540(1)	B	625	-
74	841502	A	-	-	0	0	0	0	0	2	4	-	-	-	-	-	-	-	-	300(2)	A	360	-
75	188549	B	-	-	0	0	0	0	2	-	-	-	-	-	-	-	-	-	-	240(2)	B	290	-
76	847414	A	-	-	0	0	0	0	0	0	0	0	1	-	-	-	-	-	-	440(1)	A	525	-
77	848712	A	-	-	0	0	0	0	0	0	0	1	-	-	-	-	-	-	-	390(1)	A	435	-
78	848866	A	-	-	0	0	0	2	0	-	-	-	-	-	-	-	-	-	-	180(2)	A	210	-
79	103571	B	-	-	0	0	0	0	0	0	0	0	1	3	-	-	-	-	-	470(1)	B	540	bradycardia, hypotension
80	837533	B	-	-	0	0	0	0	0	0	1	2	4	-	-	-	-	-	-	360(1)	B	480	-
81	848555	A	-	-	0	0	0	0	2	2	-	-	-	-	-	-	-	-	-	240(2)	A	305	-
82	172189	A	-	-	0	0	0	0	0	0	0	0	1	-	-	-	-	-	-	480(1)	A	525	-
83	319097	A	-	-	0	0	0	0	2	-	-	-	-	-	-	-	-	-	-	240(2)	A	270	-
84	852029	B	-	-	0	0	0	0	0	0	0	1	-	-	-	-	-	-	-	410(1)	B	430	-
85	697554	B	-	-	0	0	0	0	0	1	-	-	-	-	-	-	-	-	-	290(1)	B	345	-
86	844706	A	-	-	0	0	0	0	0	1	3	-	-	-	-	-	-	-	-	240(1)	A	360	-
87	232859	A	-	-	0	0	0	0	1	3	-	-	-	-	-	-	-	-	-	240(1)	A	300	-
88	928720	A	-	-	0	0	0	0	1	2	-	-	-	-	-	-	-	-	-	240(1)	A	345	-
89	881673	A	-	-	0	0	0	0	0	0	2	3	-	-	-	-	-	-	-	360(2)	A	420	-
90	696813	A	-	-	0	0	0	0	0	0	1	-	-	-	-	-	-	-	-	350(1)	A	405	-
91	797348	A	-	-	0	0	0	0	0	2	3	-	-	-	-	-	-	-	-	300(2)	A	360	-
92	888006	A	-	-	0	0	0	0	1	1	-	-	-	-	-	-	-	-	-	240(1)	A	345	-
93	440309	A	-	-	0	0	0	0	0	0	1	-	-	-	-	-	-	-	-	335(1)	A	390	-
94	731893	A	-	-	0	0	0	0	0	0	0	2	-	-	-	-	-	-	-	420(2)	A	425	-
95	882798	A	-	-	0	0	0	0	0	0	0	2	3	-	-	-	-	-	-	420(2)	A	480	-
96	881673	A	-	-	0	0	0	0	1	3	-	-	-	-	-	-	-	-	-	240(1)	A	300	-
97	888006	B	-	-	0	0	0	0	0	0	0	1	3	-	-	-	-	-	-	410(1)	B	480	-
98	440309	B	-	-	0	0	0	0	0	0	0	0	1	4	-	-	-	-	-	480(1)	B	540	-
99	882798	B	-	-	0	0	0	0	0	0	0	0	0	1	2	-	-	-	-	520(1)	B	625	-
##	835627	A	-	-	0	0	0	0	2	2	-	-	-	-	-	-	-	-	-	240(2)	A	305	-

6839
29/08/2020

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No.08 BFUHS 6888

Date 20/8/2020

The Principal
Dayanand Medical College,
Ludhiana

Subject: **Change and Delet of Co-Supervisor**

This is in reference to you office on the above mentioned subject. In this connection, you are informed that the Worthy Vice C' ancellor has very kindly accepted your recommendations and appointed new Supervisor & Co-supervisor as mentioned below.

Name of Student/	Specialty	Existing Guides	Proposed Guides
Dr. Arshnoor Kaur	General Surgery	**Supervisor:** Dr. Sanjeev K. Singla Prof., Dept. of Surgery, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Jaspal Singh Prof. & Head, Dept. of Surgery, DMCH, Ludhiana.	**Supervisor:** Dr. Sanjeev K. Singla Prof., Dept. of Surgery, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Jaspal Singh Prof. & Head, Dept. of Surgery, DMCH, Ludhiana. Dr. Munish Trehan Assoc. Prof., Dept. of Surgery, DMCH, Ludhiana.
Dr. Nitika Singla /	Anaesthesiology	**Supervisor:** Dr. Sunil Katyal Prof. & Head, Dept. of Anaesthesiology, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Kamakshi Garg Assoc. Prof., Dept. of Anaesthesiology, DMCH, Ludhiana. Dr. Ashima Taneja Prof. & Head, Dept. of Obst. & Gynae., DMCH, Ludhiana.	**Supervisor:** Dr. Kamakshi Garg Assoc. Prof., Dept. of Anaesthesiology, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Anju Grewal Prof., Dept. of Anaesthesiology, DMCH, Ludhiana. Dr. Ashima Taneja Prof. & Head, Dept. of Obst. & Gynae., DMCH, Ludhiana.

All conc

DMV 29/8/20

Dr. Richa /	Anaesthesiology	**Supervisor:** Dr. Sunil Katyal Prof. & Head, Dept. of Anaesthesiology, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Mirley Rupinder Singh Prof., Dept. of Anaesthesiology, DMCH, Ludhiana. Dr. Namrata Assoc. Prof., Dept. of Anaesthesiology, DMCH, Ludhiana.	**Supervisor:** Dr. Dinesh Sood Prof. & Head, Dept. of Anaesthesiology, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Mirley Rupinder Singh Prof., Dept. of Anaesthesiology, DMCH, Ludhiana. Dr. Namrata Assoc. Prof., Dept. of Anaesthesiology, DMCH, Ludhiana.

The student may be requested to attach photocopy of this letter along with plan approval letter while submitting thesis in the university. All concerned may also be informed accordingly.

Dr. S P Singh, MS (Oph)

Controler of Examinations

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No. BFUHS/2K19p-TH/ 10385

Date 9/9/19

The Principal,
DMC, Ludhiana.

Subject: **Approval of Plan of Thesis.**

This is to inform you that the Faculty of Medical Sciences in its meeting held on 29.05.2019 has approved the plan of thesis of **Nitika Singla**, a student of your college for **MD Anaesthesiology** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis

Comparison of analgesic efficacy of dexamethasone versus dexmedetomidine as an adjuvant to ropivacaine in ultrasound guided transverse abdominis plane block for postoperative pain relief in caesarean section

Supervisor
Dr. Sunil Katyal
Prof. & Head,
Dept. of
Anaesthesiology,
DMCH, Ludhiana.

Co-Supervisor
Dr. Kamakshi Garg
Assoc. Prof.,
Dept. of Anaesthesiology,
DMCH, Ludhiana.

Dr. Ashima Taneja
Prof. & Head,
Dept. of Obst. & Gynae.,
DMCH, Ludhiana.

The student has to submit the four copies of thesis (along with PDF format) , to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She must directed to attach a photocopy of this letter with the forwarding letter while submitting thesis to the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic,(if any).

S P Singh

Dr. S P Singh MS(Oph)
Controller of Examinations

Note :

1. *If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.*
2. *The student may submit the thesis as per the schedule already conveyed i.e for May/June examination 30th Nov of the preceding the year of examination and for Nov/Dec examinations 31st May of the year of examination.*

4/2-2018

COMPARISON OF ANALGESIC EFFICACY OF DEXAMETHASONE VERSUS DEXMEDETOMIDINE AS AN ADJUVANT TO ROPIVACAINE IN ULTRASOUND GUIDED TRANSVERSE ABDOMINIS PLANE BLOCK FOR POSTOPERATIVE PAIN RELIEF IN CAESAREAN SECTION

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE **SUBMITTED**

IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

Doctor of Medicine

In

ANAESTHESIOLOGY

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

December, 2018

Dr. **Nitika Singla**

DEPARTMENT OF ANAESTHESIOLOGY
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA
LUDHIANA, PUNJAB-141001

ABSTRACT OF PLAN OF THESIS

Title	Comparison of analgesic efficacy of dexamethasone versus dexmedetomidine as an adjuvant to ropivacaine in ultrasound guided transverse abdominis plane block for postoperative pain relief in caesarean section
For the degree of	M.D. Anaesthesiology
Name of the candidate	Dr Nitika Singla
Supervisor	Dr. Sunil Katyal, Professor & Head, Department of Anaesthesia, DMCH, Ludhiana
Co-supervisor	Dr. Kamakshi Garg, Associate Professor, Department of Anaesthesia, DMCH, Ludhiana
Co-supervisor	Dr. Ashima Taneja, Professor & Head, Department of Gynaecology and Obstetrics, DMCH, Ludhiana
Institution	Dayanand Medical College and Hospital, Ludhiana
University	Baba Farid University of Health Sciences, Faridkot

Introduction: Adequate pain control after caesarean delivery is major concern and it usually comprises a combination of systemic and regional techniques. Many modalities have been used like non-steroidal anti-inflammatory drugs, opioids and wound infiltration with local anaesthetics. With the use of ultrasound guided Transverse abdominis plane block which inhibits abdominal neural afferents by introducing local anaesthetics into neurofascial plane between internal oblique and transverse abdominis muscles, the reduction of post operative pain following abdominal and pelvic surgeries including caesarean delivery has become the feasible option.

Aim of study: The aim of this study will be to compare between dexamethasone and dexmedetomidine as an adjuvant with ropivacaine in ultrasound guided Transverse abdominis plane block for postoperative analgesia after caesarean delivery performed under spinal anaesthesia.

Material and Methods: A randomized study will be conducted on 100 ASA I-III parturients undergoing caesarean section under subarachnoid block [SAB] which will be divided into 2 groups. Group A will receive 50ml of 3mg/kg ropivacaine with along with 0.1mg/kg dexamethasone and Group B will receive 50ml of 3mg/kg ropivacaine along with 1mcg/kg of dexmedetomidine through bilateral TAP block. Patient's VAS score would be assessed. Data thus collected will be statistically analysed.

Clinical significance: Post-op pain relief provides an increased patient's satisfaction levels for the procedure. In this study, we will compare analgesic efficacy of dexamethasone and dexmedetomidine as an adjuvant to ropivacaine for postoperative pain in caesarean section.

(Signature) Candidate	(Signature) Co-supervisor	(Signature) Co-supervisor	(Signature) Supervisor	(Signature) Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled **"COMPARISON OF ANALGESIC EFFICACY OF DEXAMETHASONE AND DEXMEDETOMIDINE AS AN ADJUVANT IN ULTRASOUND GUIDED TRANSVERSE ABDOMINIS PLANE BLOCK FOR POSTOPERATIVE PAIN RELIEF IN CAESAREAN SECTION"** exist in the Department of Anaesthesiology at Dayanand Medical College and Hospital, LUDHIANA and will be provided to the candidate. We will see that the data being included in the thesis are genuine and is collected by the candidate herself under our supervision and guidance.

Supervisor

Sunil Katyal

Dr. Sunil Katyal
Professor & Head
Deptt. of Anaesthesia
DMCH, Ludhiana

Co-Supervisor

Kamakshi

Dr. Kamakshi Garg
Associate Professor
Deptt. of Anaesthesia
DMCH, Ludhiana

Dr. Ashima Taneja
Professor & Head
Deptt. of Gynaecology & Obstetrics
DMCH, Ludhiana

Head of the Department

Sunil Katyal

Dr. Sunil Katyal
Professor & Head
Department of Anaesthesia
DMCH, Ludhiana

Place : Ludhiana

Date :

APPROVAL PROFORMA
BY
RESEARCH & ETHICAL COMMITTEE
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA

Name of candidate	Dr. Nitika Singla
Department	Anaesthesiology
Topic of Thesis	Comparison of analgesic efficacy of dexamethasone versus dexmedetomidine as an adjuvant to ropivacaine in ultrasound guided transverse abdominis plane block for postoperative pain relief in caesarean section
Likely date of appearing in PG examination	MAY-JUNE 2021
Date of enrollment	9th May, 2018
Name of Head of Department	Dr. Sunil Katyal
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Signature of Members of Research Committee with Stamp	**Signature of Members of Ethics Committee with Stamp**
1. HOD Pharmacology	1. HOD Physiology
2. HOD Surgery	2. HOD Pathology
3. HOD Pathology	3. HOD Pharmacology
4. HOD Medicine	4. HOD SPM
5. Dean Academics	5. HOD Medicine
6. Vice Principal	6. HOD Surgery
	7. HOD Obst. & Gynae
	8. Legal Expert
	9. Secretary, IEC
	10. Dean Academics
	11. Vice Principal
	12. Principal

Approved: Yes / No

Chairperson
Research Committee

Chairperson
Research Committee

Approved: Yes / ~~No~~

Chairperson
Ethics Committee

Chairperson
Ethics Committee

BABA FARID UNIVERSITY OF HEALTH SCIENCES, FARIDKOT

PROFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

1	NAME OF THE CANDIDATE AND ADDRESS	NITIKA SINGLA HOUSE NO.229 JATTAN WALA BANS, CINEMA ROAD CITY- NABHA, DISTRICT- PATIALA, PUNJAB.
2	NAME OF THE INSTITUTE	Dayanand Medical College& Hospital, Ludhiana
3	COURSE OF STUDY AND SUBJECT	MD ANAESTHESIOLOGY
4	DATE OF ADMISSION OF COURSE	MAY 9, 2018
5	TITLE OF THE TOPIC	Comparison of analgesic efficacy of dexamethasone versus dexmedetomidine as an adjuvant to ropivacaine in ultrasound guided transverse abdominis plane block for postoperative pain relief in caesarean section

6. BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

Caesarean section, one of the most commonly performed surgery which shows a steadily increasing trend these days. The intensity of postoperative acute pain among patients after a C-section results from the development of somatic and visceral pain which occurs due to cutting of the structures of the abdominal wall and the uterus.[1]

Pain after caesarean section usually affects mother-baby bonding, care of baby, and breastfeeding.[2] The pain management should be adequate and also safe for the breastfeeding baby.

To achieve effective analgesia, a multimodal strategy should be used with simultaneously administered painkillers, specialized peripheral nerve block techniques, local infiltration of wound and continuous epidural infusion.

Traditional pain management with opioids increases the incidence of side effects such as excessive sedation and postoperative nausea and vomiting, sedation, respiratory depression and hyperalgesia.[3] Thus, alternatives such as peripheral nerve block or wound infiltration have been suggested. Multimodal analgesia strategies with different classes of analgesics or local anesthetics may enhance pain relief and reduce side effects after surgery. The transversus abdominis plane (TAP) block, a newer regional nerve blockade, has been used as part of a multimodal strategy to optimize postoperative pain control.[4]

The TAP block produces a sensorial block via local anaesthetic infiltration, between the internal oblique muscle and transverse abdominis muscle, by targeting the innervating spinal nerves in this plane.[4] This block affects

thoracic intercostal nerves 7–12, the ilioinguinal nerve, the iliohypogastric nerve and lumbar nerves 1–3 in the lateral cutaneous branches.[5] Ultrasound-guided TAP (US-TAP) block provides direct visualization of the anatomy.

Complications are minimal while performing US-TAP block because the precise location of the needle and diffusion of local anaesthetics can be observed directly using this technique.

Transverse abdominis block with ropivacaine alone has not consistently been proven to be useful after caesarean section. A study showed that TAP Block with dexmedetomidine leads to delay in time of onset of pain and use of first rescue analgesic after caesarean section.[6]

There are several meta-analysis quoting the perineural use of dexmedetomidine as the best adjuvant to local anaesthetics for peripheral nerve blocks to prolong the duration of motor and sensory blockade. Dexmedetomidine in the dose of 1 mcg/ kg is generally sufficient to provide a high quality of peripheral nerve block with minimal risk of transient bradycardia and postoperative sedation. The onset of motor and sensory block is very quick and within 10 minutes. The duration of motor block will be around 7 - 8 hours and that of sensory block will be around 10-12 hours, when dexmedetomidine is used as an adjuvant. Dexmedetomidine may mediate its peripheral neural block faciliatory effects via mechanisms that are probably independent of alpha-2 receptors. In fact, this effect may be due to hyperpolarization of neuronal cation currents resulting in the inhibition of substance P release in the nociceptive pathway at the dorsal root neurons. It has more pronounced inhibitory effects on A-delta and C-fibre action potentials, rather than the motor neurons.[7]

Another study showed the addition of dexamethasone to local anaesthetics as an adjuvant increased the duration of in TAP block. Dexamethasone exerts its analgesic action by inhibiting transmission and neural discharge in nociceptive C-fibres. Steroids prolongs analgesia when administered as adjuvant in regional blocks. It has also been found that dexamethasone at doses more than 0.1 mg/kg is an effective adjunct in multimodal strategies to reduce post-operative pain and opioid consumption after surgery. After a thorough literature search we found studies in which dexamethasone or dexmedetomidine were used as adjuvants to local anaesthetics in regional nerve blocks.[8] However, we could not find any study comparing these two drugs as an adjuvant in TAP Block.

We therefore will be conducting a study to compare the analgesic efficacy of dexamethasone and dexmedetomidine as an adjunct to ropivacaine in transverse abdominis block for management of postoperative pain in caesarean section.

6.2 REVIEW OF LITERATURE

The transversus abdominis plane (TAP) block was first defined by Rafi in 2001[5] and it is commonly used in clinical practice as part of the multimodal analgesic therapy for a wide variety of abdominal procedures including large bowel resection, open/laparoscopic appendectomy, caesarean section, total abdominal hysterectomy[9],and iliac crest bone graft. The TAP block produces a sensorial block via local anaesthetic infiltration, between the internal oblique muscle and transverse abdominis muscle, by targeting the innervating spinal nerves in this plane. This block affects thoracic intercostal nerves 7–12, the ilioinguinal nerve, the iliohypogastric nerve and lumbar nerves 1–3 in the lateral cutaneous branches.[5]

An ultrasound-guided approach was first described in 2007 by Hebbard et al.[8] The authors applied a transversely orientated ultrasound probe to the anterolateral abdominal wall where the three muscle layers are most distinct. After identification of the TAP between the internal oblique and transversus abdominis muscles, the probe was moved posterolaterally to lie across the midaxillary line just superior to the iliac crest (i.e., over the triangle of Petit). The block needle was then introduced anteriorly and advanced in an in-plane approach. Real-time ultrasonography facilitates easy needle visualization as it approaches and reaches the target fascial plane.

Mohamed tawfik et al.[10] did a double blind, randomized controlled trial comparing bilateral ultrasound guided TAP block with single shot local anaesthetic wound infiltration with 0.25% bupivacaine for analgesia after caesarean delivery performed under spinal anaesthesia and concluded that they did not significantly differ regarding postoperative fentanyl consumption,

pain scores, and patient satisfaction in parturients undergoing caesarean delivery under spinal anaesthesia.

Michel et al[3] compared the analgesia effect of ultrasound guided Transverse abdominal plane (TAP) block versus continuous wound infusion (CWI) with levobupivacaine after caesarean delivery and found that in cases of morphine free spinal anaesthesia for caesarean delivery there is no difference between TAP block and CWI for postoperative analgesia.

Aydogmus et al[11] did a randomized study on 70 pregnant women using 0.25% levobupivacaine, to compare ultrasound guided TAP block with wound site infiltration for postoperative pain management and found that USG guided TAP block was superior to infiltration anaesthesia for postoperative pain management in caesarean sections as it provided longer lasting and more efficient analgesia.

Shradha Sinha et al[12] studied the comparison of ultrasound guided transverse abdominis plane block with bupivacaine and ropivacaine as adjuncts for postoperative analgesia in laproscopic cholecystectomies. Ropivacaine provides effective analgesia in the immediate post-operative period upto 1hr as compared to bupivacaine. However, both the drugs are similar in terms of 24hr cumulative rescue analgesic requirement.

Roshan John et al[4] randomized 60 patients for studying the analgesia efficacy of bupivacaine with fentanyl versus bupivacaine alone in transverse abdominal block after elective caesarean delivery. He concluded that the TAP block as part of a multimodal analgesic regimen definitely has a role in providing superior analgesia in the postoperative period. However, adjunct

fentanyl to local anaesthetic bupivacaine was found to have no added advantage when quality and duration of analgesia was compared.

Sun N et al did a randomized study and show that only the TAPB with 0.375% and 0.5% ropivacaine was able to reduce the opioid consumption 24 hours after the surgery.[13]

In another study, Baaj et al. randomized 40 women to receive either local anesthetic or saline TAP blocks in addition to a plain bupivacaine spinal block for elective cesarean section. A significant reduction in 24-hour morphine requirement was observed in the local anesthetic TAP block group versus controls. Although the authors report lower PONV, lower 24-hour VAS scores, and higher satisfaction in the local anesthetic TAP block group, no statistical measures were reported.[14]

Andrijan et al randomized 90 patients for unilateral open inguinal hernia repair and studied the effect of adding dexamethasone as a ropivacaine adjuvant in ultrasound guided Transverse abdominis plane block. They concluded that US-TAP Block performed with ropivacaine and 4mg dexamethasone is an effective and safe adjunct to multimodal postoperative analgesia as compared to US-TAP performed with ropivacaine.[15]

In another study, Jyoti P Deshpande et al randomized 60 patients to evaluate the analgesic efficacy of dexamethasone when added to ropivacaine in transverse abdominis plane block for transabdominal hysterectomy under subarachnoid block. They concluded that with addition of dexamethasone to ropivacaine in TAP Block prolong the postoperative analgesia and reduced the analgesic requirements following open abdominal hysterectomy without any major side effects.[16]

A.akkaya et al studied the effect of adding dexamethasone to levobupivacaine in ultrasound guided transverse abdominis plain block for postoperative analgesia after caesarean section on 42 patients and found that the time before the administration of the first additional analgesic dose was prolonged significantly in the dexamethasone group compared to levobupivacaine group. The pain scores were lower in the dexamethasone group.[17]

Prannal bansal et al did doubled blind study on 40 patient and studied the effect of adding dexmedetomidine as an adjuvant to ropivacaine in ultrasound guided transverse abdominis plane block for post-operative pain relief in caesarean section and found that the addition of dexmedetomidine to ropivacaine leads to delay in time to onset of pain and use of rescue analgesia.[6]

Another study Uma Datt et al have seen that with addition of dexamethasone to ropivacaine in ultrasound-guided transverse abdominis plane block significantly prolongs the duration of post-operative analgesia in inguinal hernia.[8]

Waleed A Almarakbhi et al randomized 50 patients for abdominal hysterectomy and concluded that with addition of dexmedetomidine to bupivacaine in TAP block achieves better local anesthesia and provides better pain control post-operatively without any major side-effects.[18]

Thus the present study is undertaken to compare the adjuvant effect of adding dexamethasone and dexmedetomidine to 3mg/kg of ropivacaine in transverse abdominis plane block in terms of time to initial postoperative pain and time to initial rescue analgesia in patient undergoing caesarean section under subarachnoid block.

6.3 AIMS AND OBJECTIVES OF THE STUDY

- Comparative evaluation of analgesic efficacy of dexamethasone versus dexmedetomidine as an adjuvant to ropivacaine for postoperative pain relief in ceasarean section.

7. MATERIALS AND METHODS

7.1 SOURCE OF DATA

The study will be conducted in department of Anaesthesiology, Dayanand Medical College and Hospital, Ludhiana in a randomized double blind manner on a total of 100 parturients after approval from the hospital ethics committee. A written informed consent will be obtained from all parturients recruited for the study.

7.2 METHOD OF COLLECTION OF DATA

A Total of 100 parturients belonging to ASA I-III scheduled for caesarean section will be included in this study and will be randomly allocated to two groups of 50 parturients each using computer generated random number list contained in sequentially sealed envelopes. These envelopes will be opened by an anaesthesiologist not involved in the study. The same anaesthesiologist will prepare the drug solution as per random allocation group and will hand them in a blinded manner to the anaesthesiologist who will administer the block.

Group A – Comprised of 50 parturients who will receive 50 ml of 3mg/kg ropivacaine along with 0.1mg/kg dexamethasone bilaterally via TAP block.

Group B – Comprised of 50 parturients who will receive 50 ml of 3mg/kg ropivacaine along with 1mcg/kg dexmedetomidine bilaterally via TAP block.

INCLUSION CRITERIA-

- ASA I-IIIparturients
- Elective caesarean section
- 18-45 years of age

EXCLUSION CRITERIA-

- Any contraindications to spinal anesthesia

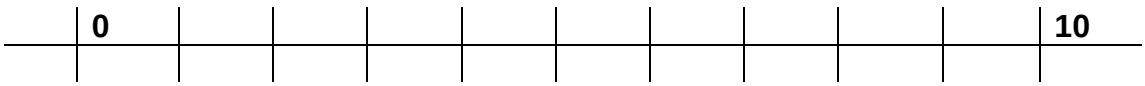
- History of recent opioid exposure
- Hypersensitivity to any of the drugs used in the study
- Significant cardiovascular, renal, or hepatic disease; and known fetal abnormalities.

METHOD OF COLLECTION OF DATA

Pre Anaesthetic Check Up

A written informed consent will be taken from all the parturients. Pre anaesthetic check up will be conducted a day before surgery which will include thorough history, general physical and systemic examination of all parturients. Required investigations like complete haemogram and coagulogram will be done before surgery. Parturients will be informed about the need of analgesia after surgery and apprised on the use of VAS scale.

VISUAL ANALOGUE SCALE



Visual Analogue Scale having 0 to 10 equidistant markings with a marker will be shown and the parturients would be educated on the use of the scale to assess the post-operative pain. Scoring will be accomplished by asking the parturient to place the marker on the scale along the 0 to 10 marks with 0 corresponding to ‘no pain’ and 10 corresponding to ‘worst imaginable’ pain. Scoring will be done according to the intensity of pain felt by parturients on interrogation after surgery.

ANAESTHESIA TECHNIQUE

One hundred parturients undergoing caesarean sections will be included in this study. Peripheral vascular access will be obtained with a 18-gauge or

20gauge intravenous cannula. Standard monitors will be applied to all parturients in the operating room. Non-invasive blood pressure (mmHg), heart rate (beat min-1), and peripheral oxygen saturation (%) values will be tracked by non-invasive methods on regular time interval as per protocol. Under all aseptic precautions, spinal anaesthesia will be administered, using a midline standard approach. The intrathecal space will be accessed by traversing the L3–L4 interval, with a 26-G Quincke needle. After confirmation of clear cerebrospinal fluid flow, 12 mg of 0.5% hyperbaric bupivacaine will be injected intrathecally. The anaesthesiologist will perform spinal anesthesia on patients in the left lateral or sitting position. Only patients with successful spinal anaesthesia will be included in the study. After the completion of surgical procedure, all included parturients will receive the TAP block as per group allocation. An experienced anaesthesiologist will perform the transverse abdominis plane block by placing the ultrasound probe in the transverse plane to the lateral abdominal wall in midaxillary line between the lower costal margin and iliac crest. The needle will be introduced in plane of ultrasound probe directly using in-line approach and advanced until it reaches the plane between the internal oblique and transversus abdominis muscles. The probe will follow the needle entry point medially in its superficial path and then return to its original position in the midaxillary line as the needle is directed deeper. Upon reaching the plane, 2 ml of saline will be injected to confirm correct needle position which will be followed with the injection of total volume of 50 ml of drug solution bilaterally via TAP block. This time of institution of TAP block will be taken as time zero. Time to initial reporting of postoperative pain will be recorded and the VAS value at this time will also be noted. Post-

operative pain will also be evaluated by VAS at hourly interval till VAS ≥3. The patients will be asked to provide a number, with ten being the most worst pain they ever had, and zero being no pain. Rescue analgesic will be administered at VAS ≥3 and this time will be recorded as time of first rescue analgesic requirement. Slow intravenous injection of diclofenac sodium 75 mg will be administered as first rescue analgesic and continued on 8 hourly basis thereafter.

Post-operative pain scores till the time to first rescue analgesic requirement will be recorded along with haemodynamic parameters. The end point of the study will be VAS ≥3 when the first rescue analgesic dose will be administered. Any patient sleeping comfortably in the bed at any time of observations will not be disturbed and considered to be pain free having VAS score of less than 3 at that time of observation. Adverse event if any will be noted.

Blinding

A person not involved in the study will prepare the study drugs in 50cc coded syringe labelled study drug and hand it over to anaesthesiologist at end the of the procedure under all aseptic precautions. The candidate herself will assess and record the time to initial postoperative pain and time to initial rescue analgesic administration following the surgical procedure. At the end of the study, the codes will be decoded.

Outcome

The outcome of parturients will be evaluated in terms of time to initial postoperative pain and time of first rescue analgesic administration post-

operatively at VAS ≥3 post-operatively. Any adverse effects will also be evaluated.

Primary Outcome Measures:

a)Time to initial postoperative pain.

Secondary Outcome Measures:

a) Time to initial rescue analgesia administration at VAS ≥3

b) Adverse effects if any.

OBSERVATIONS

The following parameters will be recorded post-operatively after shifting the patient to recovery room:

- Monitor Heart Rate (HR), NIBP, Respiratory Rate (RR), SpO2 (oxygen saturation) hourly.
- Assessment of pain using visual analogue scale hourly and whenever parturient complains of pain after shifting to post-operative recovery room.
- Time of giving first rescue analgesic administration at VAS ≥3.
- Adverse effects if any.

STATISTICAL ANALYSIS

Data will be described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. Comparison of quantitative variables between the study groups will be done using Student t-test and Mann Whitney *U* test for independent samples for parametric and non-parametric data respectively. For comparing categorical data, Chi square ($\chi 2$) test will be performed and exact test will be used when the expected frequency is less than 5.A probability value (*p* value)less than 0.05 will be considered statistically

significant.All statistical calculations will be done using SPSS (Statistical Package for the Social Science) SPSS 21 version statistical program for Microsoft Windows.

Sample Size Calculation

Sample size calculation was done based on the study done by Bansal P et al[6] as a template and using time to rescue analgesia as the main parameter and power came out 0.95 and with effect size of 0.73 with 10% chance of error. The sample size of 50 each for two groups was taken i.e. total sample size of 100.

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.

Yes

7.4 HAS ETHICAL CLEARANCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3?

No

8.0 LIST OF REFERENCES

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PROFORMA

GROUP: CR NO:

SERIAL NO: DATE OF ADMISSION:

NAME: DATE OF SURGERY:

AGE/SEX: ADMISSSION NO:

WEIGHT: ADDRESS:

HEIGHT: BMI:

OCCUPATION:

SURGEON:

ANAESTHESIOLOGIST:

TIME OF START OF SURGERY:

DURATION OF SURGERY:

ASA GRADE:

PRE-ANAESTHETIC CHECK-UP

RELEVANT HISTORY

PRESENT:

PAST:

PERSONAL HISTORY:

GENERAL PHYSICAL EXAMINATION:

BLOOD PRESSURE:	PULSE:	RESPIRATORY RATE:
TEMPERATURE:	PALLOR:	JAUNDICE:
CYANOSIS:	JVP:	CLUBBING:
OEDEMA:	LYMPHADENOPATHY:	TRACHEA:
BREATH HODING TIME:	THYROMENTAL DISTANCE:	
MOUTH OPENING:	DENTAL STATUS:	
TEMPOROMANDIBULAR JOINT MOBILITY:		MALLAMPATTI SCORE:

ASA GRADE:

SIGNATURE OF CANDIDATE **SIGNATURE OF SUPERVISOR**

SYSTEMIC EXAMINATION

CHEST:

CARDIOVASCULAR SYSTEM:

CENTRAL NERVOUS SYSTEM:

ABDOMEN:

INVESTIGATION: **DATE** **REPORT**

Hb

TLC

PLATELETS

PT/ INR

RBS

INTRAOPERATIVE VITALS:

	Heart Rate (bpm)	**Systolic Arterial Pressure (mmHg)**	**Diastolic Arterial Pressure (mmHg)**	**Mean Arterial Pressure (mmHg)**	**Peripheral Oxygen Saturation (%)**	**Respiratory Rate (per min)**
Baseline (Pre-induction)						
10 Min.						
20 Min.						
30 Min.						
40 Min.						
50 Min.						
1 hour						
1h10Min						
1h20Min						
1h30Min						
1h40Min						
1h50Min						
2hours						
2h10Min						
2h20Min						
2h30Min						

SIGNATURE OF CANDIDATE **SIGNATURE OF SUPERVISOR**

TIME OF ANALGESIC REQUIREMENT

Time when patient complaints of pain									
VAS									

TIME TO FIRST RESCUE ANALGESIC CONSUMPTION-

SIGNATURE OF CANDIDATE **SIGNATURE OF SUPERVISOR**

POST OPERATIVE VITALS:

	Heart Rate (bpm)	Systolic Arterial Pressure (mmHg)	Diastolic Arterial Pressure (mmHg)	Mean Arterial Pressure (mmHg)	Peripheral Oxygen Saturation (%)	Respiratory Rate (per min)
Baseline						
10						
20						
30						
40						
50						
60						
1h 30m						
2h						
2h 30m						
3h						
4h						
5h						
6h						
7h						
8h						
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22h						
23h						
24h						

SIGNATURE OF CANDIDATE **SIGNATURE OF SUPERVISOR**

SIDE EFFECTS IF ANY:

Side effect	**Treatment given**
Nausea and Vomiting	
Skin rash	
Tachycardia HR>100 per min	
Bradycardia HR<50 per min	
Hypotension SAP <90mmHg	
Sedation	
Others	

SIGNATURE OF CANDIDATE **SIGNATURE OF SUPERVISOR**

INFORMED PATIENT CONSENT

Date: _____

I……..D/o, W/o, S/o……. ……am willing to participate in the study **"COMPARISON OF ANALGESIC EFFICACY OF DEXAMETHASONE VERSUS DEXMEDETOMIDINE AS AN ADJUVANT TO ROPIVACAINE IN ULTRASOUND GUIDED TRANSVERSE ABDOMINIS PLANE BLOCK FOR POSTOPERATIVE PAIN RELIEF IN CAESAREAN SECTION"** The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

……. Signature of the Witness

Name:

……. Signature of the patient

Signature of Supervisor

Signature of Candidate

मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____

निवासी _____

इस शोधकार्य **"COMPARISON OF ANALGESIC EFFICACY OF DEXAMETHASONE VERSUS DEXMEDETOMIDINE AS AN ADJUVANT TO ROPIVACAINE IN ULTRASOUND GUIDED TRANSVERSE ABDOMINIS PLANE BLOCK FOR POSTOPERATIVE PAIN RELIEF IN CAESAREAN SECTION"** में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

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गवाह के हस्ताक्षर रोगी के हस्ताक्षर/अंगूठे का निशान

नाम: नाम:

_____

अन्वेषक के हस्ताक्षर

_____

विद्यार्थी के हस्ताक्षर

ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____

ਵਾਸੀ _____

“COMPARISON OF ANALGESIC EFFICACY OF DEXAMETHASONE VERSUS DEXMEDETOMIDINE AS AN ADJUVANT TO ROPIVACAINE IN ULTRASOUND GUIDED TRANSVERSE ABDOMINIS PLANE BLOCK FOR POSTOPERATIVE PAIN RELIEF IN CAESAREAN SECTION” ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

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ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ_____ ਮਿਤੀ_____

ਪਤਾ _____ ਪਤਾ _____

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ਨਿਰੀਖਕ ਦੇ ਹਸਤਾਖਰ

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ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ